PI name & contact details:	**Dr. Plamen Stamenov (Ussher Lecturer, Assistant Professor and Principal Investigator)**
School: ***Has project been agreed with head (or nominee) of proposed registration school?***	**School of Physics, Trinity College, Dublin 2, Ireland** ***Yes***
Research Centre / group affiliation:	**School of Physics and CRANN, Trinity College, Dublin 2, Ireland**
Research group / centre website:	**http://www.tcd.ie/Physics/Magnetism/** **http://www.crann.tcd.ie/**
PI website / link to CV:	**http://www.tcd.ie/Physics/people/Plamen.Stamenov/index.php** **http://www.crann.tcd.ie/Research/Investigators/School-of-Physics/Dr-Plamen-Stamenov.aspx**

Brief summary of PI research / research group / centre activity (2 or 3 lines max):

Dr. Stamenov's research is focused on the areas of magnetism, spin electronics and applied superconductivity. In particular, on topics such as magnetotransport, Andreev reflection spectroscopy, SQUID applications and magnetic sensors development.

Title & brief description of PhD project (suitable for publication on web):

Development of Broadband SQUID-based Ferromagnetic Resonance Spectrometer using Precession Cone-Angle Detection

Contemporary magnetism is headed towards exploring increasingly faster magnetisation dynamics, often much below the nanosecond timescale. Industry, on the other side, continuously expands the operation frequencies of communication and computation devices, aiming to satisfy the virtually unquenchable consumers' thirst for bandwidth. FerroMagnetic Resonance (FMR) measurements have conventionally relied on absorption or dispersion-based inductive techniques either at fixed frequencies, using microwave cavities; or in broadband modes, using strip lines and coplanar waveguides. An alternative to these induction-based techniques exist – the detection of the *z*-axis projection of the magnetic moment or the precession cone angle. Kerr effect has already been demonstrated to be a useful detection principle in this respect.
The project will involve the analytical and numerical design, simulation, construction and characterisation of a (Superconducting QUantum Interference Device) SQUID-based FMR setup, with bandwidth of 1 kHz to 50 GHz. Applications in the field of characterisation of mm- and micron-scale ferromagnetic structures and devices will be tested and evaluated.
The project is best suited for a 1 to 2-year MSc programme.

Unique selling points of PhD project in TCD:
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.

The PhD student will be placed within a vibrant research group in the fields of magnetism and spin electronics, with numerous links and collaborations with other institutes in Europe, USA, China, India and Japan. Apart from all the conventional thin film deposition, structuring and characterisation equipment, necessary for the completion of the project, the student will have access to a world-class advanced microscopy suite and a number of purpose-build magnetotransport and magnetometry systems. Links with a leading FMR group (Montreal, Canada) have been also established as a basis for this project.

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.

Name & contact details for project queries, if different from PI named above:

Please indicate the graduates of which disciplines that should apply:

Physics, Electronic Engineering

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)	X
Health and Biomedical Sciences	
Information and Communication Technologies (ICTs)	
Aerospace	
Pharmaceuticals	
Oil, Gas and Coal	
Renewable Energy	
Minerals	
Biotechnology	
Nanotechnology and New Materials	
Technology of prevention and remediation of natural disasters	
Biodiversity and Bioprospection	
Marine Sciences	
Creative Industry	
New technologies in constructive engineering	