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 Experimental Methods for the Study of Intermediate Frequencies Magnetisation Dynamics in Hard Magnetic Materials

The traditional realm of application of magnetically hard materials has been the generation of static magnetic fields, in use in mechanics and electro-mechanics. More recently, high performance magnetic systems, such as CoPt, FePd and Mn_2Ga have been looked at from the point of view of the magnetic recording industry. There the continuous push towards ever higher bit-densities [in both hard drives and Magnetic Random Access Memory (MRAM) applications] has lead to a demand for materials with coercive fields and anisotropy fields, well in excess of 1 MA/m. Since the recording process typically involves large-angle magnetisation dynamics, the details of the process at high external field slew rates can be extremely important. Solutions for hysteresis magnetisation and torque curve measurements are commonplace for frequencies below about 100 kHz, while pulsed (variable slew rate) techniques are virtually the sole option for timescales below about 1 µs.
The project will involve the analytical and numerical design, simulation, construction and characterisation of platforms for applying rapidly-varying magnetic fields, bridging the gap of the intermediate frequencies (approximately 100 kHz – 1 GHz), while performing high sensitivity magneto-optics-based or induction-based magnetisation and torque measurements. Applications in the characterisation of novel materials and structures for the magnetic recording industry are envisaged, as well as the development of fundamental understanding of the behaviour of the coercivity and remnance, and models for the detailed magnetisation dynamics, at intermediate frequencies.
The project is best suited for a 4-year PhD 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 hard drive manufacturing company are also envisaged 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)	
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	