PI name & contact details:	**Prof. Vojislav Krstić** **e-mail: krsticv@tcd.ie**
School: ***Has project been agreed with head (or nominee) of proposed registration school?***	**School of Physics** ***Yes***
Research Centre / group affiliation:	**Centre for Research on Adaptive Nanostructures and Nanodevices**
Research group / centre website:	**www.crann.tcd.ie**
PI website / link to CV:	**www.crann.tcd.ie/Research/Investigators/School-of-Physics/Prof-Vojislav-Krstic.aspx**

Brief summary of PI research / research group / centre activity (2 or 3 lines max):
Research on electronic transport, magnetoelectrical and -optical properties in novel nanosized and nanostructured materials, comprising magnetic-field- and temperature-dependent experiments. Materials investigated: Ge & InAs nanowires, graphene, chiral nano-metals, carbon nanotubes

Title & brief description of PhD project (suitable for publication on web):
Title: "Magnetoresistance in graphene with ferromagnetic superstructres"

The relativistic character of charge-carriers in graphene is a key-property for this material to be identified as a high potential candidate for electronic applications replacing and complementing existing state-of-the-art semioconductor-based platform technologies. Superstructuring of graphene opens the pathway to the exploitation of these relativistic properties specifically if the spin degree-of-freedom is addressed, too. Hence, magnetic superstructuring of graphene provides a way to develop electric-field tuneable spin-current splitters, low-dissipative THz rectifiers and novel magnetoresistive sensors. Within this framework, the longitudinal and transverse resistance of superstructured graphene is to be determined for DC and AC currents as a function of gate, temperature, and magnetic field. This project implies experimental work in nano-device fabrication of superstructured single-layered graphene, Raman-microscopy, and electrical measurements without and with magnetic fields within the temperature range from 300 K down to a few ten mK.

Unique selling points of PhD project in TCD:

- the candidate will be exposed to current state-of the-art lithography techniques and techniques for electrically contacting a wide range of nano-materials

- the candidate will work in the newly emerging field of 2D magnonics and 2D magnonic crystals

- the candidate will work on a state-of-the-art dry cryogenic system with integrated superconducting magnet and be trained in the cryogenic and vacuum techniques. The PI's laboratory is the first and only laboratory in Ireland with such a system and the expertise to carry out experiments in such ones on single nano-objects

- the candidate will work on questions related to industrial needs in the field of resistive sensors

- the candidate will be supported by the hosting PI in participating in the Innovation Academy

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

Please indicate the graduates of which disciplines that should apply: **Physics** **Electrical Engineering** **Materials Science** **Nanoscience**

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	