

PI name & contact details:	Dr. Thomas Archer and Professor Stefano Sanvito
School:	School of Physics and Crann
<i>Has project been agreed with head (or nominee) of proposed registration school?</i>	Yes
Research Centre / group affiliation:	Computational spintronics group
Research group / centre website:	http://www.spincomp.eu/
PI website / link to CV:	http://www.tcd.ie/physics/people/tom.archer
Brief summary of PI research / research group / centre activity (2 or 3 lines max):	
The quantum mechanics provides an accurate description of materials on the nanoscale, however these equations are too difficult to solve. In the spintronics group we work on simplifying these equations to describe how matter behaves on the nanoscale.	
Title & brief description of PhD project (suitable for publication on web):	
Tunnel junctions: Nanotechnology sounds farfetched however you probably already one. The hard disk read head is a device formed from two ferromagnetic layers with an insulator layer sandwiched between them. The current through such a tunnel junction is dependent upon the relative magnetization of the two ferromagnetic layers. In this project we will use quantum mechanical modelling to study and try to introduce new functionality into these interesting devices.	
Unique selling points of PhD project in TCD:	
<i>The spintronics group is a leading group in quantum mechanical electron transport modelling, our in house code SMEAGOL is distributed internationally. Smeagol is one of the few tools capable of such a study making this project unique. We have over 3000 compute cores available on campus 1000 of which are solely for the use of our research group</i>	
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, computational chemistry and applied mathematics	
Ciência sem Fronteiras / Science Without Borders Priority Area:	
<i>Please indicate the specific programme priority area under which the proposed PhD project fits- choose only one (tick box):</i>	
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	

