

## **Studies of interface structures in exchange bias systems**

The phenomenon of exchange bias where a ferromagnetic thin film is grown in contact with an antiferromagnetic thin film so as to fix its magnetisation on one direction is a critical component of most potential spintronic devices and in particular magnetic recording read heads. Following the publication of a seminal paper in 2010 the York Magnetism and Spintronics Group is recognised as having a world lead in the understanding of these complex materials. We have been funded by Seagate Technology from Northern Ireland for many years to undertake these studies.

We are now at the point where the behaviour of the bulk of the antiferromagnetic grains is understood. However the behaviour at the interface between the ferromagnetic and antiferromagnetic layers remains a partially open question. The competing complex exchange interactions result in unusual behaviour which this project aims to study. The studies will involve low temperature (4.2K) magnetic measurements and advanced transmission electron microscopy with elemental analysis. We will also undertake some X-ray magnetic circular dichroism (XMCD) studies using the Diamond Light Source. In this way we hope to be able to elucidate the behaviour of individual or clusters of atomic spins at the interface.

The project has additional support (\$20K per annum) from Seagate Technology in Northern Ireland and the student undertaking the project will have the opportunity to undertake a summer internship in the Londonderry facility which is the UK's highest tech factory.

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The project will attract the standard EPSRC stipend of £14,057 free of all taxes and full tuition fees will be paid. Additionally the student will earn a few £K per year teaching in the undergraduate labs, again free of tax. Students interested in the project can approach either Gonzalo [gonzalo.vallejofernandez@york.ac.uk](mailto:gonzalo.vallejofernandez@york.ac.uk), Stuart [stuart.cavill@york.ac.uk](mailto:stuart.cavill@york.ac.uk) or myself to discuss the details of the project and can apply via the online link <http://www.york.ac.uk/study/postgraduate/apply/>. The project will start in October 2015. Students interested should make an application by the 20<sup>th</sup> February.

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