



## Candidate Information

<b>Position:</b>	Research Fellow - All-Optical Magnetic Switching
<b>School/Department:</b>	School of Mathematics and Physics
<b>Reference:</b>	26/113205
<b>Closing Date:</b>	Monday 30 March 2026
<b>Salary:</b>	£41,519 - £49,536 per annum
<b>Anticipated Interview Date:</b>	Thursday, 23 April 2026
<b>Duration:</b>	36 months

### JOB PURPOSE:

To be a highly productive, ambitious and collaborative member of the EPSRC project Deterministic Recording via All-Optical Magnetic Switching (DREAMS) spanning Queen's University Belfast (materials synthesis & device test), University of Exeter (ultrafast optical characterisation), University of York (theory & simulation) and Seagate Technology (device fabrication & test). Based at Seagate Technology (Springtown), you will lead microfabrication and metrology to realise device structures from pre-deposited magnetic wafers, including design and patterning of pillars and Hall bars, process integration, and electrical/optical metrology to evaluate stacks for all-optical magnetic switching (AOS).

You will plan and run cleanroom process flows end-to-end—from mask design and lithography, through etch, metallisation, passivation, and wafer-level test—working closely with DREAMS partners to align device architectures with project work-packages. This post requires executing independent research in device fabrication and metrology, operating within a complex team, and delivering high-quality, timely results to accelerate discovery and device translation.

### MAJOR DUTIES:

1. Translate magnetic stack designs into manufacturable device layouts (pillars for CPP-GMR and Hall bars for SOT/OHE/REE measurements).
2. Develop, document and optimise cleanroom process flows, covering resist selection, spin-coating, exposure (i-line/DUV), development, lift-off, dry/wet etch (IBE/RIE), dielectric/metal patterning, planarisation as appropriate, and passivation/encapsulation.
3. Fabricate arrays of devices across wafers to enable pillar-diameter selection and redundancy to account for yield and potential high-current damage; implement process controls to minimise side-wall and current-crowding artefacts.
4. Integrate electrical access (contacts/vias) and prepare samples for low-current CPP-GMR and magnetotransport characterisation prior to high-current STT/SOT stressing.
5. Perform metrology: CD/overlay (optical/SEM), sidewall profile (SEM/AFM), film thickness (ellipsometry/profilometry), and device-level electrical tests (four-point probe, Hall, anisotropic/planar/anomalous MR). Coordinate with time-resolved polar MOKE and wide-field Kerr microscopy (WFKM) measurements at partners and internal facilities, including AOS verification.
6. Record and analyse GMR/ CPP signatures at low current density, progress to controlled high-current pulsing for STT switching.
7. Support the two-colour optical measurements by fabricating and providing structures enabling demagnetisation and NM spin accumulation probing.
8. Maintain comprehensive process documentation, travellers and standard operating procedures; contribute to risk assessments and ensure compliance with EHS and cleanroom best practice.
9. Produce high-quality research outputs (reports, datasets, co-authored publications) and present milestones at project meetings and conferences.
10. Assist in the preparation of funding proposals and engagement with industry where appropriate.
11. Undertake occasional supervision/demonstrating aligned to the post holder's expertise.

### ESSENTIAL CRITERIA:

1. Normally have or be about to obtain a relevant PhD in Physics, Materials Science, Electrical/Electronic Engineering, or a closely related field with demonstrable specialism in microfabrication, magnetics/spintronics, or nanoelectronic devices.
2. Recent relevant research experience to include:
  - Conducting device fabrication with lithography (photo/e-beam), lift-off and etch (IBE/RIE);
  - Patterning of magnetic multilayers into pillars/Hall bars;
  - Magneto transport measurements (e.g. four-point probe, Hall, AMR/PMR/AHE, CPP-GMR);
  - Proven ability to carry out rigorous analyses, critical evaluations and interpretation of experimental data;
  - Teamworking experience;
  - Publication record commensurate with career stage.
3. Ability to contribute to broader management and administrative processes, including EHS compliance, process documentation, and data management.
4. Contribution to outreach and engagement with industry/community groups.
5. Willingness to undertake additional training in research methods and cleanroom/laser/electrical safety as required.
6. Practical problem-solving skills, independence of thought and initiative.
7. Proficiency with data analysis tools (e.g., Python/Matlab/Origin).
8. Ability to communicate complex information effectively in oral and written formats.
9. Ability to build relationships and develop internal/external networks.
10. Willingness to present at project meetings and conferences.
11. Ability to assess and organise resources.
12. Meticulous attention to detail.
13. Ability to work to deadlines in a fast-paced cleanroom environment.
14. Commitment to reproducibility and quality.

**DESIRABLE CRITERIA:**

1. Hold a PhD in experimental spintronics.
2. Experience of large wafer (>100mm wafer) device fabrication workflows.
3. Experience with design of experiments (DoE) and statistical process control (SPC) for yield/optimisation.
4. STT/SOT device fabrication experience.
5. STT/SOT metrology experience.
6. Experience with time-resolved polar MOKE/WFKM.
7. Effective teamwork within a collaboration.
8. CAD for masks (e.g., KLayout).
9. Record of contributed / invited talks at international conference.