



Candidate Information

Position:	Research Fellow in Nanoscale Thermal Transport of Ferroelectric Domain Walls
School/Department:	Ctre for Nanostructured Media
Reference:	21/109263
Closing Date:	Thursday 11 November 2021
Salary:	£34,304 per annum.
Anticipated Interview Date:	Thursday 9 December 2021
Duration:	Fixed Term Contract for 36 months

JOB PURPOSE:

The Centre for Nanostructured Media (CNM) at Queen's University Belfast is seeking a postdoctoral researcher as part of a new project investigating the heat flow properties of ferroelectric domain walls (project ref: MR/T043172/1 <https://gtr.ukri.org/projects?ref=MR%2FT043172%2F1>). The position will assume responsibility for the delivery of specific research objectives as part of a recently awarded UKRI Future Leaders Fellowship program, held by the PI. The appointee will work within the PI's team alongside PhD students as well as members of other groups associated with the world-class nanoscale ferroelectrics activity in the Centre. The planned thermal transport research will be pursued at a fundamental level and will be heavily experimentally focused.

MAJOR DUTIES:

1. Undertake research under supervision within the specific research project, and as a member of the PIs research team to investigate the heat flow properties of ferroelectric domain walls.
2. Set up/carry out measurements of the thermal transport properties of ferroelectric/ferroelastic crystals with domain wall microstructures. This may involve techniques such as e.g. low temperature steady state heat flow measurements, electrothermal measurements (e.g. 3-omega method), micro-bridge method, and Scanning Thermal Microscopy (using our in-house Asylum MFP-3D atomic force microscope).
3. Design and fabrication of bulk and nanoscale thermal devices incorporating ferroelectric elements.
4. Carry out analyses and critical evaluations to correlate theory with experiments and to develop physical understanding of the mechanisms by which domain wall microstructure affects thermal transport.
5. Ability and willingness to develop/build upon existing thermal lab infrastructure.
6. Produce high quality research outputs consistent with project aims and commensurate with career stage. This will include collaborating and co-authoring with PI and project team (as appropriate) on outputs.
7. In consultation with the project team, promote research milestones and outputs at national and international conferences.
8. Carry out undergraduate supervision/demonstrating/teaching duties at a level to be agreed, and to assist with project-related outreach activities as required.
9. Undertake supplementary duties relevant to the success of the project including administrative duties and additional training and development activities as required.

Planning and Organising:

1. Plan own day-to day activity within framework of the agreed research programme.
2. Contribute to the planning of research project, reports and publications etc.
3. Assist PI and project team in organising relevant events.

Resource Management Responsibilities:

1. Ensure research resources are used in an effective and efficient manner. Take responsibility for the operation and upkeep of key equipment in the thermal laboratory (e.g. cryostat) as necessary.
2. Be able to take on a mentoring role to research students in the group and to be able to assist in the management and day-to-day running of their projects.

3. Provide guidance, as required, to ensure a safe working environment.

Internal and External Relationships:

1. Liaise on a regular basis with members of the project team and with project partners, when required.
2. Build contacts with relevant stakeholders to form relationships for future collaboration and project dissemination.

ESSENTIAL CRITERIA:

1. * Degree or equivalent in physics, materials science or other cognate area of relevance to the post.
2. * Hold or about to obtain a PhD in a relevant area (e.g. Physics, Materials Science).
3. * At least 3 years relevant experimental research experience.
4. * Expertise and experience in one or more of the following: experimental thermal transport measurements; investigation of ferroic domains or domain wall phenomena; ferroelectrics; functional oxides.
5. Ability to contribute to broader management and administrative processes.
6. Sufficient breadth and depth of specialist knowledge in the discipline and of research methods/techniques to work within established research programmes.
7. Ability to communicate complex information in English effectively in oral and written format.

DESIRABLE CRITERIA:

1. * Relevant PhD research experience in one or more of the following: thermal transport measurements, low temperature thermometry, scanning thermal microscopy, ferroelectrics, functional oxides, domain walls.
2. * Significant experience with techniques/methods for thermal transport measurement e.g. steady state heat flow, 3-omega method, suspended micro-bridge method, Scanning Thermal Microscopy.
3. * Significant experience in and knowledge of nanoscale aspects of ferroelectric materials or nanoscale characterisation techniques relevant to ferroelectrics e.g. Scanning Probe Microscopy.
4. * Experience in sample preparation and handling techniques, such as Focused Ion Beam machining.
5. * Experience with software development for data acquisition.
6. * Demonstrable experience with numerical simulation software e.g. finite element modelling.
7. * Dissemination/publication record commensurate with level of experience.
8. Contribute to the School's outreach programme by links with industry, community groups etc.
9. Practical problem solving skills, independence of thought and initiative.
10. Ability to prepare and give well-timed, coherent and insightful presentations.
11. Strongly motivated, able to work independently and take ownership of the project.
12. Able to work as part of a team and assist with day-to-day management and mentoring of PhD students.
13. Willingness to travel both nationally and internationally as required by the role.