



Project Title:	Hierarchical ferroelectric composites for energy conversion technologies
Lead Supervisor and co-supervisors:	Dr James Roscow (lead), Pro Chris Bowen, Dr Hamideh Khanbareh
Industrial Partner:	N/A

Project Summary

We are looking to recruit a PhD student to develop new fabrication methods for the next generation of piezoelectric and ferroelectric composites for energy harvesting, sensing and actuation.

The ability of ferroelectric-based materials to harvest energy and information from ambient environments makes them of significant interest for the next generation of smart electronic devices. Forming composites based on ferroelectric ceramics offers the opportunity to tailor the functional and mechanical properties depending on the requirements of specific applications. Recent advances in fabrication techniques such as freeze casting enable the control microstructures across a range of length scales not achievable using traditional processes and could provide a route to improving functional properties in the future. Novel low temperature (<250°C) fabrication methods also have the potential to disrupt the ceramic market, with traditional methods requiring sintering regimes above 1000°C, and are of significant interest for the next generation of functional composites that utilise the properties of ferroelectric ceramics.

An enthusiastic, creative and inquisitive student is therefore sought to investigate new methods for fabricating piezo- and ferroelectric composites with microstructural control over a range of length scales, and their underlying microstructure-property relationships with the aid of numerical modelling techniques. This position is aligned to an EPSRC project “Microstructural Engineering of Piezoelectric Composites.”

Sustainability issues addressed

Improving the performance of piezoelectric and ferroelectric composites will lead to more efficient use of raw materials, and investigating new low energy fabrication methods will contribute to improving the sustainability of these materials for energy harvesting and sensing applications in particular.

Eligibility criteria and selection process

Candidate Requirements:

Applicants should hold, or expect to receive, an undergraduate Masters first class degree or MSc distinction (or non-UK equivalent). English language entry requirements must be met at the time of application to be considered for funding, see [Postgraduate English language requirements for international students \(bath.ac.uk\)](http://www.bath.ac.uk/postgraduate/english-requirements/)

Application:

Informal queries should be directed to: Dr James Roscow - Jir24@bath.ac.uk

More information about applying for a PhD at Bath may be found here:

<http://www.bath.ac.uk/guides/how-to-apply-for-doctoral-study/>



Expected start date: 4 October 2021

Funding Eligibility:

In order to be considered for a studentship, you must qualify as a 'Home' student. The UK Government has not yet published the relevant Fee Regulations for courses commencing in 2021/22; however, our current understanding is that the main categories of students likely to qualify for 'Home' fees are (subject to confirmation by the UK Government):

- UK nationals (meeting residency requirement*)
- Irish nationals resident in the UK/Ireland since at least September 2018
- EU/EEA applicants with settled or pre-settled status in the UK under the EU Settlement Scheme (meeting residency requirement*)
- Applicants with indefinite leave to enter/remain in the UK (meeting residency requirement*)

**Residency requirement: in most cases applicants must have lived in the UK, EU, EEA or Switzerland continuously since September 2018.*

EU/EEA citizens who live outside the UK are unlikely to be eligible for 'Home' fees and funding.

Up-to-date information may be found on our [fee status guidance webpage](#) and on the [UKCISA website](#).