

# Fergus Moore

## PhD Student

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Fergus joined the BCFN in September 2016 after graduating with a BSc in Physics from King's College London in the same year. Fergus was drawn towards research after working in industry for QuantuMDx; a company developing a point-of-care device based on a nanowire biosensor. So far Fergus has spent time researching gels and thin-film solar cells. He is keen to continue working in fields where simulation and experiment are complimentary.

### **“Active Matter in Porous Materials”**

On small length scales (nm to  $\mu\text{m}$ ), active matter is a model for both artificial self-propelled particles (i.e. Janus particles, active emulsion droplets) and biological microswimmers, such as motile cells and bacteria. The dynamics of active matter in unbounded, homogeneous and low-Reynolds number environments are well described by Active Brownian motion and run and tumble dynamics. However, in practise, active systems will not occur in these idealised environments. There has yet to be seen, an experimental study of Janus particles in three-dimensions, and certainly not in the presence of walls and obstacles. This project aims to be one of, if not the first of such projects where model active matter systems are studied in a representative environment.

We approach the work from two complementary directions: Molecular dynamics simulations of active Brownian particles in model colloidal gels; and through experiment, where we will observe and track Janus particles, propelled via induced charge electrophoresis, to study the dynamics of active matter in porous media.