Dr Paul McGonigal (Durham University)

**Manipulating Interactions across Lipid Membranes.**

This CDT studentship will challenge students to (1) use synthetic organic chemistry to make small molecules that insert into lipid membranes, (2) prepare and analyse lipid vesicles, and then (3) investigate the transport of ions across the lipid membranes. The overarching goal is to develop synthetic small molecules that can improve the transport of ions across plant membranes. The Food and Agriculture Organization of the United Nations predicts that food production must rise by 70% over the next 40 years to meet the demands of a growing population expected to reach nine billion by the year 2050 – fundamental understanding of how to manipulate transmembrane interactions is necessary to artificially enhance photosynthesis. The CDT project will contribute to this fundamental understanding. Compounds will be synthesized through ~4–5 steps of organic synthesis each. Transport will be investigated using artificial lipid bilayers (vesicles), monitoring with fluorescence spectroscopy and voltammetry techniques in the McGonigal Group.