



# PROJECT TITLE: The ecosystem and climate impacts of HFOs, the latest CFC replacements

Project Science Theme: Climate Change and Risk Project keywords: Ecosystem. Measurements, Modelling, Climate, TFA

Lead Institution: University of Bristol Lead Supervisor: Dudley Shallcross, University of Bristol, Chemistry

**Co-Supervisor:** Rukshan Navaratne, Cardiff University, School of Engineering **Co-Supervisor**: Kieran Stanley, University of Bristol, Chemistry

Project Enquiries: <u>d.e.shallcross@bristol.ac.uk</u> Webpage: <u>https://www.bristol.ac.uk/chemistry/research/acrg/</u>

### Project aims and methods:

HFOs (hydrofluoro-olefins) are being used as replacements for HFCs and HCFCs, with very shortlifetimes they should have small global warming potentials and zero stratospheric ozone depletion potentials. However, recent work on those containing a CF3 group, suggest that they rapidly form trifluoracetic acid (TFA) at the surface. Global modelling suggests that high levels could accumulate in surface waters such as rivers and lakes and land surfaces near to high human populations. The impact of this strong acid on ecosystems is unknown but is likely to be highly detrimental. In addition, for some CF3 containing HFOs, formation of long-lived potent greenhouse gases (GHGs), such as CF3H has been observed, from the reaction with ozone, dramatically alters the climate impact of these species. Several projects can be explored. The ACRG (atmospheric chemistry research group) contribute to a worldwide network that measures concentrations of currently used and emerging HFOs, you could develop methods to measure new HFOs, collect and analyse data from that network. You could undertake global and regional modelling of the generation of TFA and GHGs and their environmental impact or carry out laboratory studies to determine the yield of GHGs generated or develop a method for field measurements of TFA.

### **Useful recruitment links:**

For information relating to the research project please contact the lead Supervisor via:

### Bristol NERC GW4+ DTP Prospectus:

https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-trainingpartnership-nerc/

## How to apply to the University of Bristol: http://www.bristol.ac.uk/study/postgraduate/apply/

The application deadline is Monday 13 January 2025 at 2359 GMT.

