

## Ocean Adjoint Modeller – Cambridge

### British Antarctic Survey

**Location:** Cambridge  
**Salary:** £28,200 to  
£30,600 per  
annum  
**Hours:** Full Time,  
Part Time  
**Contract Type:** Contract /  
Temporary

**Placed on:** 30th

November  
2016

**Closes:** 8th January  
2017

**Job Ref:** BAS 122/16

### Main Description

The British Antarctic Survey (BAS) is inviting applications for an experienced ocean modeller with an excellent academic profile including a strong mathematical background and a track record of running ocean or coupled-climate models on high-performance computing facilities and interpreting the results. Direct experience of models based on the MITgcm and/or experience of setting up and using adjoint models would be considered a significant advantage. This is a 36 month (or equivalent part time) position for a suitably qualified postdoctoral researcher and will contribute to two projects funded by the Natural Environment Research Council (NERC): ORCHESTRA (Ocean regulation of climate by Heat and Carbon sequestration and Transports), and SMURPHS (Securing Multidisciplinary Understanding and Prediction of Hiatus and Surge events).

These projects both require high-resolution adjoint ocean models in the Southern Ocean region based on the MITgcm to be implemented on the UK's supercomputer ARCHER. You will need to demonstrate that they have training/experience in implementing closely related modelling initiatives on the same or very similar computing infrastructures. Within the ORCHESTRA project, the adjoint models will be used to test the sensitivity of the Southern Ocean heat uptake and subduction/export to various physical surface forcing effects (wind, buoyancy etc.) as well as test the influence of model setup on the obtained results. The postholder will use this output to inform likely perturbation experiments of regional forward model runs in other elements of ORCHESTRA. The SMURPHS project will make use of the same or similar adjoint to investigate the role of the Southern Ocean overturning circulation in mediating global ocean/atmosphere heat exchange, and specifically its role in climate 'hiatuses' both past and present. This project will involve comparison of ocean/atmosphere interaction under hiatus and warming conditions and will be conducted in collaboration with researchers at the National Oceanography Centre Southampton working on equivalent NEMO based adjoints. The postholder will need an understanding of the global climate system, and specifically the role that Southern Ocean dynamics play in mediating the wider climate.

**Purpose:**

The post is attached to the ORCHESTRA and SMURPHS projects, both of which require high-resolution adjoint ocean models of the Southern Ocean to be implemented on the UK's supercomputer ARCHER. You will have previous experience in implementing similar, though not necessarily adjoint modelling initiatives on the same or very similar computing infrastructures. Within the ORCHESTRA project, the adjoint models will be used to explore the impact of surface forcing on the subduction/obduction of heat and carbon between the ocean mixed layer and interior. Results will be fed through to other groups within ORCHESTRA to inform forward forcing runs. SMURPHS work will be similar, but emphasis will be on examining how different atmospheric states may drive enhanced/reduced heat uptake and consequently lead to changes in global surface temperatures/warming. Both elements will make use of the BAS / SOSE Online model (BASSOON), which forms the basis for the adjoint modelling approach

**Duties:**

- Implement adjoint ocean models of the Southern Ocean on the UK's supercomputer ARCHER
- Carry out simulations with the adjoint models in support of the objectives of the ORCHESTRA and SMURPHS projects
- Attend ORCHESTRA/SMURPHS project meetings and engage with associated project partners to deliver the project objectives
- Lead high-quality publications resulting from the projects