Modelling global ocean diversity of zooplankton and response to climate change

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2. **Summary**: Models are essential to link our multidisciplinary understanding of ocean processes with observations and to make projections of the potential consequences of global change on marine ecosystems and carbon cycling. Considerable progress has been made in representing the physics of ocean circulation and more recently in the ecology of phytoplankton, but the representation of zooplankton such as foraminifera, which play a key role in transforming the fluxes of carbon and nutrients fixed by phytoplankton as well as in producing calcium carbonate, has to date been limited.

*MIT-Darwin model results (Follows and Dutkiewicz, 2011)*

This project will create a unique representation of planktic foraminifera in a global ocean model ([MIT-Darwin](#) model) based on key ecological understanding of foraminifera in relation to calcification, temperature, food sources and size. This will enable the importance of ocean acidification, temperature, and oxygen stressors on the distribution and diversity of foraminifera in the global ocean to be explored and projections made of the impact of future climate change on the marine plankton community and feedbacks with atmospheric $pCO_2$.

3. **Added value**
   - The student will have full access to the University of Bristol supercomputer, Bluecrystal, now in its 3rd incarnation. The student will also have the opportunity to be in the lab where foraminifera are being cultured.
   - The student will have the chance to attend postgraduate courses if required – especially ‘Introduction to Earth System Modelling’ and ‘Past and Future Climate Simulation’