How did the ocean floor and sunken islands form off the Western Australian coast?

In late 2011, we had a hugely successful scientific cruise offshore Perth, collecting dredge samples from three previously completely unexplored seafloor plateaus and ridges. We were expecting to mainly dredge typical oceanic rocks such as basalts; however, unexpectedly we have obtained a number of samples of (i) sandstone from submarine knolls 100s of kilometers offshore, and (ii) gabbro that should be located at depth beneath the seafloor but forms part of an oceanic ridge.

In light of these unexpected results we are able to offer a multi-disciplinary Honours project to undertake a petrological/geochemical study of a suite of igneous and sedimentary rocks involving a variety of analytical techniques such as light microscopy, scanning electron microscopy, ICP-MS analysis and possibly radiometric dating.

The work will be undertaken with the aim of answering scientific questions such as (i) What is the provenance of the sedimentary rocks from the Gulden Draak Knoll and how do they link to rocks from the Perth margin? (ii) Is the Dirck Hartog Ridge an unusual intra-oceanic compressional ridge? (iii) What was the role of the Kerguelen mantle plume in the formation of these oceanic features? Answering these questions will enable you to refine existing tectonic and palaeogeographic reconstructions of the break-up between India and Australia.

This honours project will help you develop igneous and sedimentary petrology, analytical geochemistry and tectonic reconstruction skills that are highly regarded by mineral and petroleum industries and academia.

You will be supervised by Dr Derek Wyman and Dr Adriana Dutkiewicz and you will interact closely with Dr Joanne Whittaker, Dr Simon Williams and members of the EarthByte Group in the School of Geosciences. The igneous/sedimentary/petrographic nature of the project requires an above average mark in GEOS2114: Volcanoes, Hot Rocks, and Minerals and GEOS3103/3803 Sedimentary & Environmental Geology.