PROJECT TITLE: The boring inside of coral: Endobionts and bioerosion rates in museum collections of coral from Indonesia

Supervisors: Dr Erica Hendy, University of Bristol, School of Earth Sciences
Dr Ken Johnson, Natural History Museum, London, Earth Sciences Department

Project Enquiries: e.hendy@bristol.ac.uk; l.bertini@nhm.ac.uk

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Proposed start date: 18 July 2022

Project description: Coral reefs are biodiversity hotspots and the carbonate skeletons of coral colonies provide the habitat and accommodation for much of the reef’s biodiversity. In this project you will use computer tomography scans of museum specimens to reveal the chambers and bioerosion caused by endobionts (i.e. the organisms living within the coral colonies). The key questions we want you to help us answer are:

• How have endobiont populations, diversity and functional groups changed since the 1820s (when the first museum samples were collected from the reef sites)?
• Is there a relationship with changes in water quality and environmental conditions?
• Are endobionts adding to the reef carbonate budget or reducing it through bioerosion?

To achieve this you will learn to identify the taxa present within coral skeletons (e.g. sponges, bivalves, or Christmas tree worms; Fig. 1) from their trace fossils; quantify how much skeleton they inhabit; and measure how much calcium carbonate they deposited or eroded from the skeleton. Volume quantification, annotation and colony dating will be completed using computer-based tools like AVIZO or Dragonfly to analyse µ-CT scans and GIMP for image annotation.

Figure 1. An infestation of Christmas tree worms (Spirobranchus giganteus) in a massive Porites coral colony, reconstructed from micro-CT scans using AVIZO (image: Leo Bertini)
**Work schedule:**

6 weeks: desk work at university
1 week including trip to the Natural History Museum London to work with specimens.
Report and poster work: 3 x ½ day throughout the project to step back and assess results so as to start working towards report and poster – this will involve research group discussion. Then the whole final week to complete presentation and report.

**Candidate requirements:** The data is primarily computer-based and requires a willingness to annotate a large population of digital images with care and curiosity. The museum specimens also need to be accurately weighed during a visit to the Natural History Museum London. All training will be provided and you will be working along-side a PhD student (you can see Leo’s blogs on his work and some of the samples you will work on here [https://www.4d-reef.eu/esr/leonardo-bertini/](https://www.4d-reef.eu/esr/leonardo-bertini/)).

**Travel and subsistence costs:**

The placement will cover the cost of return travel and accommodation for the trip to the Natural History Museum in London.