

# Real-time and remote monitoring of cleaner fish interactions

## Supervisors

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## Project description

Cleaning is a common mutualistic relationship among tropical reef communities. The removal of ectoparasites along with diseased or damaged tissue benefits both parties; the 'cleaner' fish gains nutrition, whilst the 'health' of the client fish is maintained by parasite removal. Cleaner fish reduce parasite abundance on reef fish and have been shown to be drivers of species diversity and abundance. In the Caribbean the most common cleaner species include the Sharknose Goby (*Elacatinus evelynae*) a permanent cleaner, and the French Angelfish (*Pomacanthus paru*), a facultative cleaner. The French Angelfish only cleans whilst a juvenile, and perhaps for this reason its role in maintaining reef health has been largely overlooked. Whilst juvenile French Angelfish may not carry out significant numbers of cleaning events alone, at those stations that also have resident Sharknose cleaner gobies the two species may form a symbiotic relationship that acts to attract more clients (Hypothesis 1). If this multi-species mutualism between cleaner gobies and juvenile French angelfish attract more clients, a reduced parasite burden may be found on clients visiting these stations (Hypothesis 2), which would ultimately lead to a healthier reef. Despite a wealth of studies on cleaner fish interactions, relatively little attention has been given to the parasites of reef fish. Most studies have focused on large isopod parasites (e.g. Sikkel et al. 2004) while smaller helminth parasites have largely been ignored, particularly in the Caribbean cleaner-client system. Parasite biodiversity may be reduced in the presence of multiple cleaner species (Hypothesis 3).

Since 2010, we have collected extensive data on cleaner fish interactions on Booby Reef in the Man-O-War Bay, Tobago, identifying key Sharknose Goby and French Angelfish cleaner stations that are consistently visited more frequently than others (Fig. 1). Moreover, Cardiff University has long term data (10+ years) on the coral reef fish diversity in Tobago, and preliminary data to suggest that cleaners show repeatable behavioural traits along the Bold-Shy Continuum (Webster & Ward 2011). The proposed student will analyze these extensive data sets, use these findings as the basis for their own experiments and set up a remote-monitoring system to simultaneously record cleaner-client interactions in real-time. Training will be provided in behavioural ecology, epidemiology, social network theory and advanced statistics.

**Image:** Fig. 1. Sharknose Goby (left), French Angelfish juvenile (middle) and preliminary network analysis of cleaning interactions between cleaner fish at 4 different station types (red) and 28 common clients (orange) in Tobago (right image).

