THOMAS (ED) ROBERTS

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PhD candidate, 2014 to 2018
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Environmental and ecological determinants of depth distribution in reef-building corals

Ed grew up in Sydney and moved to Townsville to study Marine Biology at JCU in 2005. After several years working in public aquariums, and on the Great Barrier Reef (GBR) as a SCUBA instructor, he completed his BSc in 2012. In 2013 Ed researched largely unknown shoal habitats on the GBR for his honours project, supported by an AIMS@JCU Pilot Research Award, under the supervision of Dr James Moloney and Dr Tom Bridge. Ed was awarded first class honours for this thesis, and will be publishing these results imminently. Ed commenced his PhD in February 2014, aiming to model the ecological mechanisms of depth distribution in reef-building corals, especially vertical connectivity and source-sink dynamics.

Ecological processes driving depth distributions in reef building corals are still largely unknown, despite these patterns being one of the most obvious on coral reefs. Although much research focuses on shallow (0-10m) regions, reef-building corals can extend far below (>100m), and species richness consistently peaks in the mid-depth regions (~20m). These mid-depth regions house extensive habitat on the GBR, with deeper regions showing greater environmental stability. Understanding the extent of vertical connectivity over depth regions, through uncovering the ecological mechanisms driving coral depth distribution, will be critical to understanding how reef-building corals will respond to current and future anthropogenic impacts such as climate change.

Ed will survey reef-building corals from 0-40m depth over the Eastern Pacific, and the Great Barrier Reef, recording patterns in species abundance over depth. This data will be used to identify species distribution strategies (deep or shallow specialists, and depth generalists), and the life history traits that are common to each strategy. Representatives of these three groups will then be the subject of experiments to determine larval settlement preferences, and colonisation ability over depth, as well as relative fecundity over depth for each species. This information will be used to model potential vertical connectivity, source-sink dynamics of mid-depth regions, and likely outcomes of depth dependent disturbance events.

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