

## HONOURS PROJECT



**Project Title:** Endosymbiotic dinoflagellates of Swan River Jellyfish *Phyllorhiza punctata*

**Supervisor(s):** Dr Zoe Richards, Dr Lisa Kirkendale (WA Museum), Dr Michael Stat (Newcastle Uni)

**Project:** Brown Jellyfish *Phyllorhiza punctata* are widespread in oceans and estuaries in the Indo-Pacific, and locally, they occur in outbreak proportions in the Swan-Canning (S-C) Rivers. The jellyfish may have been introduced to the S-C system, but it is more accurate to call this species cryptogenic (i.e. a species of unknown origin). *Phyllorhiza punctata* feeds on phyto- and zooplankton but they are also photosymbiotic, receiving energy from the dinoflagellate alga that live inside the host tissue. Little is known about the dinoflagellate symbionts in the Swan River jellyfish including the type/s of symbiont, the mode of transmission, or the overall amount of photosynthetically derived energy that is provided to the host. This study will use a combination of molecular metabarcoding and fluorescence techniques to: 1). Explore the diversity and abundance of dinoflagellate symbionts in *P. punctata* from the S-C Estuary; 2). Examine the mode of symbiont transmission to determine if symbionts are acquired horizontally from the local environment, or vertically from parents; and 3). Examine the extent to which photophysiological adaptations contribute to the success of this species.

**Funding:** WA Museum (To be sought); Swan River Trust (To be sought).

**Special Requirements:** This project will involve kayak-based fieldwork and (possibly) scuba-diving in the Swan/Canning River. The student is required to have a driver's license and own transport. It is preferable if the student has a current open-water scuba diving license, at least 50 hours' scuba-diving experience. Some molecular laboratory skills and an interest in microscopy and statistics is also desirable.

### References:

- Rippingale, R.J. and Kelly, S.J. (1995). Reproduction and survival of *Phyllorhiza punctata* (Cnidaria Rhizostomeae) in a seasonally fluctuating salinity regime in Western Australia. *Marine and Freshwater Research*: 46, 1145-51.
- Graham, W.M. and Bayha, K.M., 2008. Biological invasions by marine jellyfish. In *Biological invasions* (pp. 239-255). Springer, Berlin, Heidelberg.
- Kenkel, C.D. and Bay, L.K., 2016. The role of vertical symbiont transmission in altering cooperation and fitness of coral-*Symbiodinium* symbioses. *bioRxiv*, p.067322.