**Climate change driven marine eco-evolutionary processes**

My work focuses on eco-evolutionary processes operating in the marine world as a result of climate change. I am particularly interested in dispersal, hybridization, genotypic and phenotypic variation. I draw inferences from several disciplines, genomics, physiology, behavior to answer questions directly related to biodiversity conservation, fisheries management and global climatic change. I am also interested in research dedicated to other environmental stresses such as sound and light pollution to inform management and conservation efforts. I work on temperate and tropical systems spanning three ocean basins.

**Selected publications**

**Paper1. [***Beldade, R., Holbrook, S.J., Schmitt, R.J., Planes, S., Malone, D. & G. Bernardi. (2012). Larger female fish contribute disproportionately more to self-replenishment. Proceedings of the Royal Society: Biological Sciences 279: 2116–2121 (IF = 5.06)***]** Since 2007 I have been involved in determining self-recruitment levels in the French Polynesia and have used that data to make the first contribution that relates parental phenotypic traits occurring in a natural (coral reef fish) population to the dispersal outcomes of their offspring **(Beldade et al. 2012 Proc Royal Soc B)**. I used a block design to compare female size across site (to minimize the effects of currents on larval dispersal) and found that the females that produced self-recruits were larger than those that did not. Furthermore I disentangled this effect from the increased fecundity expected in larger females.

**Paper 2. [*Beldade, R.****, A. Blandin, R. O’Donnell & Mills S.C. 2017 Cascading fitness effects of anemone bleaching on associated anemonefish hormones and reproduction. Nature Communications 8 (716) (IF = 12.1)***]** I was able to determine the importance of habitat quality for the production of offspring **(Beldade et al. 2017 Nature Comms)** due to increased sea surface temperatures a percentage of anemones in Moorea (french Polynesia) bleached; while the fecundity of anemonefish living on bleached anemones plummeted, the fecundity of fish living in unbleached anemones did not; this process was explained by endocrinological signatures of stress and reproduction.

**Paper 3. [***Norin, T., Mills, S.C. Crespel, A., Cortese, D., Killen, S.S. &* ***Beldade, R.*** *2018 Anemone bleaching increases the metabolic demands of symbiont anemonefish. Proc Royal Soc B 285: 20180282. (IF = 4.87)***]**. Measuring immediate effects of global warming on physiological and fitness associated traits of fish has been a recent focus of my research. Myself and collaborators showed how bleaching caused by elevated water temperatures affects anemones and the physiology of their symbiont anemonefish by significantly increasing their standard metabolic rate while associated to a bleached anemone **(Norin et al. 2018)**.

**Paper 4. [*Mills, S.C., Beldade, R.****, Chabanet, P., Bigot, L., O’Donnell, J & G. Bernardi (2015). Ghosts of thermal past: exposure to historic high temperatures elevates stress response in a coral reef fish. Coral Reefs 34:1255-1260 (IF = 3.96).***]** Following a latitudinal and a historical thermal gradient, colleagues and myself showed how a thermal history may be shaping the evolution of the HPI axis (that regulates organismal stress responses). The frequency of warming events and higher thermal maxima is affecting the functioning of the HPI axis.

**Paper5. [**Suzanne C Mills, Ricardo Beldade, Laura Henry, David Laverty, Sophie L Nedelec, Stephen D Simpson, Andrew N Radford. Hormonal and behavioral effects of motorboat noise on wild coral reef fish*. Marine Pollution in press (IF =5.714)***]** In this paper we combined two field-based experiments to investigate the effects of short-term (30 min) and longer-term (48 h) motorboat-noise playback on the behaviour, GCs (cortisol) and androgens of site-attached free-living orange-fin anemonefish (*Amphiprion chrysopterus*). In the short-term, anemonefish exposed to motorboat-noise playback showed both behavioural and hormonal responses. Some behaviours showed carry-over effects from motorboat noise after it had ceased, and there was no evidence for a short-term change in response to subsequent motorboat-noise playback. Longer-term noise exposure led to higher levels of cortisol in both sexes and higher testosterone levels in males, and stress-responses to an additional environmental challenge in both sexes were impaired. Circulating androgen levels correlated with aggression, while cortisol levels correlated with hiding, demonstrating in a wild population that androgen / glucocorticoid pathways are plausible proximate mechanisms driving behavioural responses to anthropogenic noise.

**Teaching**

* BIO116M, Ecología Marina, (invited)
* BIO116M, Ichthyology, (invited)
* BIO4030, Ecologia de Cambio Global, doctorado