MONASH University

PhD project opportunities with Richard Reina, School of Biological Sciences, Monash University

As part of a research program in sea turtle biology, there are PhD positions available for outstanding students. This research primarily focuses on the ecophysiology, developmental biology and conservation of a variety of sea turtle species and includes projects that are both lab and field-based. The research is based in the School of Biological Sciences at Monash University in Melbourne, Australia, with fieldwork opportunities in a variety of sites in Australia, as well as international locations including Costa Rica, USA, Mexico and Malaysia. Monash University is one of Australia's largest and most research-intensive universities, with approximately 75,000 students enrolled, including about 5,000 enrolled in research PhDs. A PhD by research in Australia is expected to be completed in a maximum of four years, with minor coursework requirements.

PhD projects are available in my research group from mid-2019 to align with the current research, with specific project possibilities including but not limited to:

- Why do many leatherback turtle nests have such poor developmental success? What are the internal and external factors that might cause this? How do we improve hatching success in this species?
- What is the cellular mechanism regulating embryonic developmental arrest in sea turtles? How does the availability of oxygen cause embryos to break arrest and resume development? Is this phenomenon connected to early embryonic failure and if so, how can we use this information to improve developmental success in vulnerable nests?
- What is the role of the microbiome in sea turtle health and development? How do embryos acquire, modify and maintain their microbiome? How do population/genetic and environmental factors influence composition of the microbiome at all life stages? Can we use an understanding of the microbiome to improve health assessments of turtles?
- How is embryonic development and post-hatching performance, including metabolic rate, influenced by environmental variables such as temperature, moisture and oxygen availability? Do the incubation conditions preadapt hatchlings to certain environmental conditions? How does this impact our understanding of threats from a changing climate?
- Why do some sea turtle embryos die when their clutch-mates survive? Why do some mothers lay clutches with consistently high hatching success, while others are consistently poor? How can we use this information to improve hatching success?
- Any brilliant idea you might have that is feasible, interesting and relevant.

How to apply:

Interested PhD applicants will need experience in ecophysiology, although not necessarily with sea turtles, and will be expected to have strong quantitative skills. To apply for the PhD at Monash you will need to have an Honours or Masters degree with a minimum one year research component. A track record of scientific publication is a major advantage in obtaining a scholarship. English language requirements apply for international students. While there are several scholarship rounds each year, applications can be made at any time with support from the proposed supervisor.

To express interest in applying, please email me at richard.reina@monash.edu You will need to provide a full CV, a statement of research interest, a copy of your academic transcript and your English language test scores if your language of instruction was not English. In your statement of research interest you will need to explain what particular project(s) you are interested in and why, how your background makes you suitable to undertake the project and what you know about the topic. I probably won't reply if you don't send all of the requested information.

The deadline for expressions of interest is May 31st, 2019.

For an overview of some of this research visit richardreina.com and see the following example publications:

Williamson, S.A., Evans, R.G., and Reina, R.D., (2017), Use of hypoxia to extend embryonic arrest in turtle eggs and prevent movement-induced mortality. **Biological Conservation**, 216: p. 86-92.

Williamson, S.A., Evans, R.G., and Reina, R.D., (2017), When is embryonic arrest broken in turtle eggs? . **Physiological and Biochemical Zoology**, 90: p. 523-532.

Rafferty, A.R., Johnstone, C.P., Garner, J.A., and Reina, R.D., (2017), A 20-year investigation of declining leatherback hatching success: implications of climate variation. **Royal Society Open Science**, 4: p. 170196.

Rings, C.C., Rafferty, A.R., Guinea, M.L., and Reina, R.D., (2015), The impact of extended preovipositional arrest on embryonic development and hatchling fitness in the flatback sea turtle. **Physiological and Biochemical Zoology**, 88(2): p. 116-127.

Rafferty, A.R., Evans, R.G., Scheelings, T.F., and Reina, R.D., (2013), Limited oxygen availability in utero may constrain the evolution of live-birth in reptiles. **The American Naturalist**, 181(2): p. 245-253.

Rafferty, A.R., Santidrián Tomillo, P., Spotila, J.R., Paladino, F.V., and Reina, R.D., (2011), Embryonic death is linked to maternal identity in the leatherback turtle (*Dermochelys coriacea*). **PLoS One**, 6(6): p. e21038.