

From MSc at Liverpool to PhD in Singapore

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I graduated from the University of Liverpool with an MSc as part of the class of 2019. I am now a PhD student in a world leading evolution and development (evo-devo) research lab at the National University of Singapore (NUS). Upon arrival in Singapore, I initially underwent a two-week quarantine period before moving into my permanent accommodation, the NUS halls of residence. Singapore is a very exciting and dynamic place to be a PhD student and even during the pandemic I have my hands full both with research and non-research activities. From the outset, my lab team were very friendly and welcoming, this made settling in and integrating easy. Life in Singapore is fast paced, however after a few months I feel like I have integrated and now call this island my new home.

My project is looking at the evolution and development of patterns found on the wings of Saturniid moths. My project is a wet lab-based project which involves transcriptome, genome and transgenic work. Currently I am designing guides for a CRISPR experiment. The aim of this experiment is to create a transgenic line through the knockout of certain key genes. The lab already has a few successful transgenic butterfly lines such as the “yellow” knockout butterfly line and I hope to add to one of these successful transgenic projects. The purpose of these knockout experiments is to determine gene function and regulation *in vivo*.



Figure 1. A fifth instar *Bicyclus anynana* caterpillar and pupae on a petri dish. The pupae will take a week to emerge into the adult butterfly.

This allows us to see what pathways are controlled by the “knocked out gene” and whether genetic co-option is available for these knocked out genes. This work gives us a deeper insight into the evolution and development of phenotypes and genotypes in Lepidoptera (butterflies and moths). When not in the main lab, my responsibilities include tending to the caterpillars as well as the adult moths and butterflies we have in the insectary. I also need to tend to the food plants which are kept in the green house and feed the butterflies, moths and caterpillars when required.



Figure 2. A dry season wild type and CRISPR yellow knockout *Bicyclus anynana* (African bush brown) enjoying some banana.

Outside of the lab other responsibilities I have as a PhD student are to attend lectures for PhD level modules and work as a teaching assistant (TA) for undergraduate modules. Being a TA is very enjoyable because as well as teaching the students you can go on field trips to special destinations within Singapore. As a TA I have found that I learn as much from the students as they learn from me. I have also been able to meet other TA's and professors from different labs within the biological sciences department, allowing me to make friends and expand my scientific circle. Currently I am a TA for the undergraduate second year biodiversity module and I have been fortunate enough to teach in several of the different Singaporean nature reserves, describing and observing the different animals and plants of the forests/mangroves which are found on the island. ■