



SHIFTING GEARS KIMBERLEY PRIOR

I grew up in Essex, England, where I spent many long summers sailing on the River Crouch and tramping around the Essex countryside with friends. It was my love of animals and the outdoors that led me to pursue a degree in Zoology, taking me to Wales, where I studied for three years at Bangor University. Arriving as a fan of large charismatic beasts, I left Bangor with a fascination (and appreciation) for the tiny beasties living inside them, some alarmingly capable of wreaking havoc and death. These are of course, parasites. The desire to specialise further in parasitology warranted a masters degree in Medical Parasitology, at the world-leading institute, the London School of Hygiene and Tropical Medicine. Here I furthered my knowledge of parasites and their transmission cycles and gained a key global health perspective by studying alongside medics and public health experts. A summer project on malaria led me to the University of Edinburgh, where I embarked on a Ph.D. studying how parasites behave inside their hosts, specifically exploring how parasites use cues from the host environment to maximise their survival and transmission to new hosts. I continued aspects of this project as a postdoc, while thinking about future fellowship applications, which took me to the Wissenschaftskolleg. E-mail: kimfaithprior@hotmail.co.uk.

I am a 3rd-generation Wissenschaftskolleg graduate; my Ph.D. advisor Sarah Reece and her advisor Andrew Read both attended Wiko as Fellows before me. This already emboldened me to try to continue the “family legacy”, and I was fortunate to be admitted into the College for Life Sciences coordinated by the lovely Ulrike Pannasch. I approached the Wissenschaftskolleg with ideas for an independent fellowship proposal. I wanted to

keep some aspects of my work up until this point, namely host-parasite interactions, but expand on how variation across the day (biological rhythms) affects the hosts' ability to survive infection. The ability to survive infection relies primarily on the immune response, which shows different levels of effectiveness throughout the day. It is likely that we will come into contact with various pathogens throughout the day, perhaps when at the supermarket or out running, and the time that this occurs will have some effect on how sick we become once infected. Experimental infections with the same pathogen in the mornings and evenings lead to dramatically different survival rates (in flies and mice), but it is unclear if there is a genetic component to this. Some individuals may experience a higher risk of increased sickness than others. With this mind, I set out to discuss these ideas with experts in the field of infection, immunity, and circadian rhythms.

I spent the first part of my fellowship travelling around Germany visiting lab groups (in Halle, Würzburg, and Münster, as well as Berlin) to discuss my project ideas and build my network. At each place, I was offered a chance to present my research in seminars, receiving questions and invaluable feedback. While doing this, I also had the chance to engage with other Wiko Fellows about my ideas, who were very encouraging and offered valuable input in the form of casual conversations and more formal discussion. Having this experience as a postdoc, while still only at the beginning of a potential career, was a real privilege. During this time, my project evolved and I landed on a study system – the mighty fruit fly, *Drosophila melanogaster*. This system would allow me to test multiple fly strains and search for variation in the response of flies to infection at different times of day, testing the hypothesis that there is variation in the degree that the immune baseline changes throughout the day, resulting in measurable differences in survival outcome. I also decided at this point to play around with the nighttime effect of artificial light on immune rhythms (which are supposed to become disrupted under this scenario) and whether this influences infection outcome. I decided to make a short trip back to Edinburgh to set up and perform an experiment testing whether infected fruit flies die faster when experiencing light pollution at night.

It was at around this stage of the fellowship that I really appreciated having the time to be able to step back and assess what I wanted out of life, i.e. I had “time to think”. Despite an interesting result from my Edinburgh experiment and having had many enjoyable conversations and meeting numerous wonderful people, I was not convinced that I wanted to remain in academia after all. A combination of the unstable lifestyle, the level of competition for very few grants and university positions, and the prospect of having to

constantly convince people that my research project is the research worth funding, in a sea of worthy projects, became disheartening. By the end of my time at the Wissenschaftskolleg, I had come to the conclusion that academic science was not my calling. At first I was very hesitant to discuss leaving academia with the other Fellows, but once I broached the subject I generally had very positive responses. I believe it is a difficult subject to talk about, with those who have stayed having sacrificed a lot to be there. But with many more Ph.D. students and postdocs than faculty positions, post-academia “success stories” are important to highlight. I am now working for the UK civil service as a statistician and am very happy!

Publications arising from time at the Wissenschaftskolleg

- Prior, K. F., F. Rijo-Ferreira, P. A. Assis, I. C. Hirako, D. R. Weaver, R. T. Gazzinelli, and S. E. Reece (2020). “Periodic parasites and daily host rhythms.” *Cell Host & Microbe* 27, 2: 176–187. <https://doi.org/10.1016/j.chom.2020.01.005>.
- O’Donnell, A. J., K. F. Prior, and S. E. Reece (2020). “Host circadian clocks do not set the schedule for the within-host replication of malaria parasites.” *Proceedings of the Royal Society B* 287: 20200347. <https://doi.org/10.1098/rspb.2020.0347>.
- Westwood, M. L., A. J. O’Donnell, P. Schneider, G. F. Albery, K. F. Prior, and S. E. Reece (2020). “Testing possible causes of gametocyte reduction in temporally out-of-sync malaria infections.” *Malaria Journal* 19: 17. <https://doi.org/10.1186/s12936-020-3107-1>.
- Prior, K. F., B. Middleton, A. T. Y. Owolabi, M. L. Westwood, J. Holland, A. J. O’Donnell, M. Blackman, D. J. Skene, and S. E. Reece (2020). “An essential amino acid synchronises malaria parasite development with daily host rhythms.” Preprint on *bioRxiv*. <https://doi.org/10.1101/2020.08.24.264689>.