



## PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

**Open PhD Position at Freie Universität Berlin,  
offered only to Chinese CSC scholarship candidates 2019**

*Please Note: this PhD position is only offered to Chinese PhD candidates for the application in the framework of the FUB-CSC PhD Program.*

<b><u>Department/Institute:</u></b>	Biology
<b><u>Subject Area:</u></b>	Host-pathogen Evolution and Ecology
<b><u>Name of Supervisor:</u></b>	Dino McMahon
<b><u>Number of Open PhD Positions:</u></b>	1
<b><u>Type of the PhD Study:</u></b>	Full-time
<b><u>Project Title:</u></b>	The Evolution of Social Insect Immunity

### **PhD Project Description:**

Sociality – the degree to which biological entities form cooperative groups – represents a major transition in the evolution of organismal complexity. Whether at the level of cells or societies, the emergence of collective groups of organisms have dramatically shaped the nature of life on Earth. This is convincingly demonstrated by the fact that multicellular organisms and social insects dominate global ecosystems. For example, multicellular life is thought to be the dominant contributor to global biomass, while ants alone are estimated to make up over a third of the total biomass of insects. Inclusive fitness in combination with environmental conditions can help to explain these transitions, but specific ecological drivers are still under debate. One potential driver that has received only modest attention are microbes, which are universally present in the environment and must be dealt with throughout the life of every organism.

The animal immune system acts as a key interface between hosts and microbes, yet little is known about the how the immune system evolved during the transition from solitary to social life. The aim of this project will be to generate insight into the evolution of immunity in an ecologically and societally relevant group of social insects: the termites. The applicant will be able to conduct comparative gene expression analyses, gene-knock out studies and behavioral experiments (social immunity), although there is a large degree a flexibility in the project aims and experiments, depending on the expertise and interests of the successful candidate.

- He, S.\* et al. (2018) Immune expansions in the cockroach *Blatta orientalis* as revealed by de novo transcriptome analysis. *G3: Genes, Genomes, Genetics*. In revision
- He, S.\*, et al. (2018) Termite soldiers contribute to social immunity by synthesizing potent oral secretions. *Insect Molecular Biology* <https://doi.org/10.1111/imb.12499>

**\*Current CSC scholar in the McMahon lab (2 additional major publications in preparation)**

### **Language Requirements:**

IELTS: 6,5 / TOEFL: 95 ibt

**Academic Requirements:**

Successful applicants must have a very good Bachelor's and Master's degree in Biology or a related subject. Applicants should ideally be interested in evolution and/or ecology, although students interested in more focused areas are also welcome. Experience in molecular biology and working with insects and/or microbial pathogens is highly desirable.

**Information of the Professor or Research Group Leader:**

Our research focuses on the ecology and evolution of host-parasites. Using insects as study systems, we are interested in the diverse selection pressures that act on and between closely associated organisms, particularly the interplay between hosts and pathogens in complex insect societies.

Current research topics include the evolution of virulence and emergence of infectious viruses in animals (with a focus on insects); the evolution and ecology of social immunity in termites; and the interaction between diet, microbiota and immunity in cockroaches.

We are members of the Centre of Infection Biology and Immunity (ZIBI) and the Biodiversity Institute – Berlin-Brandenburg Institute of Advanced Biodiversity Research (BBIB). We collaborate with the Berlin Center for Genomics in Biodiversity Research (BeGenDiv) and the core facility for biomacromolecular analysis BioSupraMol.

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**Please Note:** In a first step, the complete application should be submitted to the Beijing Office for evaluation by January 4<sup>th</sup>, 2019. Please do not contact the professor before. He/she will get in contact with you after having received the complete application via the Beijing Office in January.