**University of Leicester**

**MIBTP studentship project 2026**

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| **First Supervisor** | Dr Ko-Fan Chen |
| **School/Department** | Division Genetics and Genome Biology, School of Biological and Biomedical Sciences |
| **Email**  | kc280@leicester.ac.uk <https://www.kofanchenlab.net/>  |

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| **Second Supervisor** | Professor Ezio Rosato |
| **School/Department** | Division Genetics and Genome Biology, School of Biological and Biomedical Sciences |
| **Email**  | er6@leicester.ac.uk  |

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| **Additional Supervisor** | Dr Roberto Feuda (<https://www.unibo.it/sitoweb/roberto.feuda/en> )Dr Nils Reinhart (https://www.biozentrum.uniwuerzburg.de/en/neurogenetics/research/professorship-foerster/nils-reinhard/) |

**Section 2 – *Project Information***

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| **Project Title** | Identifying the neurogenetic network underlying visually-driven sleep |
| **Project Summary**  |
| Sleep is a behavioural quiescence widely observed in the animal kingdom.Evidence indicates that daily light and visual stimuli contribute to sleeppressure; our lab is interested in identifying the elusive molecular and neuralbasis of such vision-driven sleep. We have identified various genetic componentsin the light/vision-driven sleep in the fruit fly Drosophila melanogaster. Circuit-basedmanipulation also indicates parallel neurogenetic pathways linking thevisual system and the known sleep homeostatic centre in the fly brain. This PhDproject, therefore, aims to combine the latest techniques in connectomics andDrosophila sleep to map out these neural pathways in the fly brain. The studentwill conduct this exciting project through the following three objectives.1)Identifying sleep-controlling genetic network: By apply bulk-RNAseq, we willidentify common differentially expressed genes (DEGs) in sleep altering visualmutants. In collaboration with Feuda lab, we will then map these DEGs ontoscRNA-Seq data (2) to identify the commonly affected neural clusters.2)Identification of neural connection of vision-sleep pathway: Working with DrNils Reinhart, we will use the fly brain connectome (3) to digitally constructneural connection of vision-sleep pathway and examine its overlaps with theDEGs enriched neural clusters. The finding will be confirmed experimentally byconfocal brain imaging using customised DEGs-based reporter (2).3)Verification of the sleep modifying effect of DEGs and associated cell clusters:upon generation of the gene/neural cluster list, automatic high throughput sleepmonitor system will be used to test if reduction of these genes modifies the sleepphenotype. The reduction will be implemented in all neurons as well as in theneural clusters identified.Techniques that will be undertaken during the projectDrosophila Genetics, behaviour assay, in silico brain imaging, Bioinformatics onscRNA-Seq and Connectome, immuno-confocal brain imaging. |
| **References** |
| 1. PMID: 30865587 2. PMID: 37523539 3.PMID: 39638801 |