**University of Leicester**

**MIBTP studentship project 2026**

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| **Additional Supervisor** |  |

**Section 2 – *Project Information***

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| **Project Title** | New synthetic antibodies for circadian research |
| **Project Summary**  |
| Did you know that camels and llamas have a unique type of antibody that can bea powerful tool for science? These are nanobodies, tiny, highly stable, single-domainantibodies. Because of their small size, they can be used to manipulateor study the inner workings of cells in ways traditional antibodies cannot.Our laboratory is fascinated by the circadian clock, the complex internaltimekeeper that controls how we interact with the world around us and ourhealth. We believe that nanobodies can help us unlock its secrets.This PhD project focuses on a new and exciting way to discover nanobodieswithout needing an animal. Instead of immunizing a llama, we will use asynthetic library of billions of potential nanobody candidates. Using a techniquecalled phage display, we will screen this library to find nanobodies that bind tokey components of the circadian clock.You will be at the forefront of this research. You will start by using an existinglibrary to identify nanobodies that recognize specific clock proteins. Then, youwill take the next step: building our own high-quality synthetic library. This willallow us to find even better nanobody binders, some of which may have excitingcommercial applications.This project is a unique opportunity to gain expertise in cutting-edge molecularbiology, protein engineering, and translational research.Techniques that will be undertaken during the projectMolecular biology, cloning, PCR, phage-display, ELISA, isothermal titrationcalorimetry, mass photometry, gene expression, protein expression andpurification, bioinformatics, databases, genetics, immunoassays, confocalmicroscopy. |
| **References** |
| To learn more about the technique, check out this paper: Phage-displayedsynthetic library and screening platform for nanobody discovery. DOI:10.7554/eLife.10588. |