**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 be  a powerful tool for science? These are nanobodies, tiny, highly stable, single-domain  antibodies. Because of their small size, they can be used to manipulate  or study the inner workings of cells in ways traditional antibodies cannot.  Our laboratory is fascinated by the circadian clock, the complex internal  timekeeper that controls how we interact with the world around us and our  health. We believe that nanobodies can help us unlock its secrets.  This PhD project focuses on a new and exciting way to discover nanobodies  without needing an animal. Instead of immunizing a llama, we will use a  synthetic library of billions of potential nanobody candidates. Using a technique  called phage display, we will screen this library to find nanobodies that bind to  key components of the circadian clock.  You will be at the forefront of this research. You will start by using an existing  library to identify nanobodies that recognize specific clock proteins. Then, you  will take the next step: building our own high-quality synthetic library. This will  allow us to find even better nanobody binders, some of which may have exciting  commercial applications.  This project is a unique opportunity to gain expertise in cutting-edge molecular  biology, protein engineering, and translational research.  Techniques that will be undertaken during the project  Molecular biology, cloning, PCR, phage-display, ELISA, isothermal titration  calorimetry, mass photometry, gene expression, protein expression and  purification, bioinformatics, databases, genetics, immunoassays, confocal  microscopy. | |
| **References** | |
| To learn more about the technique, check out this paper: Phage-displayed  synthetic library and screening platform for nanobody discovery. DOI:  10.7554/eLife.10588. | |