**University of Leicester**

**MRC AIM Studentship Project 2025-6 entry.**

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| **Additional Supervisor** | Dr Nick Hannan, University of Nottingham |

**Section 2 – *Project Information***

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| **Project Title** | Functional consequences of genomic tandem repeat expansions in pulmonary fibrosis |
| **Project Summary** | |
| This important and exciting project explores an underappreciated aspect of genetics that could help us understand and treat Idiopathic Pulmonary Fibrosis (IPF), a devastating lung disease with limited treatment options. IPF is challenging because its progression is unpredictable, and current treatments only slow the disease slightly, often with side effects. By focusing on short tandem repeats (STRs)—small, repetitive DNA sequences that vary greatly between individuals—this project aims to uncover how these genetic variations might influence the development and progression of IPF. Discovering how specific STRs impact gene expression could lead to new therapeutic strategies, offering hope for better treatments in the future.  Throughout the project, the student will develop a range of valuable technical skills. These include bioinformatics techniques for analyzing large genomic datasets. The student will also gain hands-on experience with molecular biology techniques like luciferase reporter assays, used to study gene regulation, and droplet PCR, a method for precisely measuring gene expression. Although based at the University of Leicester, the project will also involve time at the University of Nottingham generating genome-edited models of lung disease in stem cells. These skills will equip the student with expertise applicable across many fields in biomedical science. | |
| **References** | |
| 1. Tanudisastro, H.A., Deveson, I.W., Dashnow, H. et al. (2024) Sequencing and characterizing short tandem repeats in the human genome. Nat Rev Genet 25, 460–475 (2024). 2. Allen RJ, et al. Genome-Wide Association Study of Susceptibility to Idiopathic Pulmonary Fibrosis. (2020) Am J Respir Crit Care Med. 201 :564-574. 3. Gymrek M, et al. (2016) Abundant contribution of short tandem repeats to gene expression variation in humans. Nat Genet. 2016 48(1):22-9. 4. Mirkin, S. Expandable DNA repeats and human disease. (2007) Nature 447, 932–940. 5. Chiu, TY., Lazar, D.C., Wang, W.W. et al. Chemoproteomic development of SLC15A4 inhibitors with anti-inflammatory activity (2024). Nat Chem Biol 20, 1000–1011. | |