**Department of Respiratory Sciences PhD studentship Project information**

**Funding Source:** Self-Funded

**Proposed project start date:** January 2025

**Closing date for applications:** Until filled

**Eligibility:** International

**Department/School:** Respiratory Sciences

**Supervisors:** Harvinder Virk ([hsv6@leicester.ac.uk](mailto:hsv6@leicester.ac.uk))

Colleen Maxwell

Fasihul Khan

David Cousins

Bench supervisor: Michael Biddle

**Project Title:**

Discovery of biomarkers and distinct pathways of fibrotic and inflammatory drivers of Interstitial Lung Diseases and their acute exacerbations

**Project Description (max 700 words):**

Interstitial lung diseases are a diverse group of inflammatory and fibrotic disorders, some of which are progressive, that lead to disabling symptoms and have limited treatment options. The current treatments broadly fit into the categories of supportive care, anti-inflammatory and anti-fibrotic. Selecting patients for appropriate treatments is very challenging, expensive and inefficient. Biomarkers that predict response to specific treatment strategy, and a better understanding of the specific pathways that differentiate inflammatory and fibrotic signalling are urgently needed.

In this project the student will use available proteomic data, cell culture and lung tissue models to define: signalling pathways that are activated by pro-inflammatory mediators and pro-fibrotic mediators. The results of this work will be empowered towards patient benefit by developing robust immunoassays, in collaboration with industry, to enable to measurement of these signalling pathways in patient samples. The student will then use quantitative mass spectroscopy to validate these assays in patient samples and begin to explore their potential use to inform treatment strategies in the Leicester Respiratory Cohort study. This is a clinical cohort study of patients with ILDs, and the student will be encouraged to contribute to this larger clinical study as appropriate.

The student will have the opportunity to develop skills in:

* Patient consent procedures in the NHS
  + Ethical acquisition of clinical samples including serum and plasma
  + Counselling patients on the benefits and risks of taking part in our research projects
* Bioinformatics
* Cell and tissue culture
* Molecular biology
  + CRISPR gene editing
  + Lentiviral vector cloning and production
  + RNAseq
* Open and reproducible scientific methodology
* Industry collaboration
* Mass spectroscopy
* Multiple immunoassay technologies (western blot, immunofluorescence, immunoprecipitation, ELISA, flow cytometry, immunohistochemistry)
* Regulatory issue in healthcare product development

The student should expect to:

* Understand and be able to contribute to the delivery of high quality ethical research within the NHS framework
* Contribute/ lead high impact peer-reviewed publications
* Present at international meetings
* Network with collaborators and potentially explore filing of patents / licencing of technologies

We prefer to work flexibly to best meet the research and training interests and needs of any prospective student. Where feasible we are happy to explore other related avenues of research to this project.

**References:**

Key background:

[Khan et al.2024](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4913735)

[Bowman et al. 2022](https://doi.org/10.1016%2FS2213-2600(21)00503-8)

[Huang et al. 2024](https://doi.org/10.1164/rccm.202309-1692OC)

Technology:

[Virk et al. 2019](https://doi.org/10.1038/s41598-019-55133-7),

[Ayoubi et al. 2023](https://doi.org/10.7554/eLife.91645.2)

[Biddle et al. 2024](https://doi.org/10.12688/f1000research.154034.1)

[Biddle and Virk. 2023](https://doi.org/10.12688/f1000research.141719.1)

Please contact Harvinder Virk if you would like more background information.

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**General enquiries to** [**cls-pgr@le.ac.uk**](mailto:cls-pgr@le.ac.uk)

**To apply please refer to** [**https://le.ac.uk/study/research-degrees/research-subjects/respiratory-sciences**](https://le.ac.uk/study/research-degrees/research-subjects/respiratory-sciences)