

Fully-funded 4-year PhD Project at Loughborough University – Ventilation Effectiveness and Coronaviruses

Project Title	Ventilation Effectiveness and Coronaviruses
Supervisor(s)	Prof Malcolm Cook
Project Description	<p>It is now widely accepted that the spread of coronaviruses such as Covid-19 is exacerbated by poor ventilation. Increasing ventilation rate may help but it is possible that the key lies in ventilation effectiveness, that is, ensuring that air moves around an occupied space in a certain manner. Highly mixed environments may not be suitable for maximising healthy indoor air quality, whereas ventilation systems in which stale air rises steadily to the ceiling where it can be safely exhausted may provide an acceptable solution to the problem. This project uses a combination of computational modelling and experimental work to investigate this hypothesis and develop guidelines for more healthy, indoor environments.</p> <p>State-of-the-art, advanced computational fluid dynamics (CFD) modelling will be carried out using our high-performance computing facility to simulate air flow patterns in office environments. A combination of air flow patterns and ventilation rate will be used to develop an appropriate metric for ventilation effectiveness. The CFD simulations will be validated using particle image velocimetry (PIV) which will be used to provide detailed predictions of air flow patterns around a breathing manikin and the dispersion of contaminants around the experimental chamber.</p> <p>Your work will lead to much-needed guidance on the effectiveness of a range of natural and mechanical ventilation strategies which can be used by architects and practicing ventilation</p>



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engineers to design healthier and safer indoor environments. In addition, you will be expected to lead on authoring high quality outputs in leading journals in the field.



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