

Fully-funded 4-year PhD Project at Loughborough University – Grey-box Building Energy Modelling

Project Title	Grey-box building energy modelling
Supervisor(s)	Dr Vanda Dimitriou
Project Description	<p>The development and use of thermal models is an integral part of the design process in existing buildings due for refurbishment. Energy predictions for existing buildings are often based on traditional forward approaches which rely on a number of assumptions for the building construction elements. In reality, the thermal properties of these elements may differ significantly from their estimated values. In a grey-box modelling approach, the building energy model parameters are informed by operational data to ensure increased accuracy. In comparison to a purely data-driven approach where all processes remain hidden in a 'black-box', this technique allows for direct interpretation of processes in physical terms and link between the model variables and the building's physical components. These models can then be used to make predictions of different retrofit scenarios and inform decision making.</p> <p>This PhD will produce new methods for grey-box model development, exploring the latest modelling software. The agreement between the informed estimates for the model parameters and the actual thermal properties of the building elements will be tested in test house and lab environments. The research will explore the applicability of this technique at multiple scales, from the individual building level though to neighbourhood/city scales.</p>