

**QUB-
Mechanical and Aerospace Engineering
2020-2021**

Title: Performance Analysis and Control of Fuel Cell Electric Bus Powertrain	
Organisation	Queen's University Belfast
Qualification	PhD
Funding Amount	Fee/studentship funding may be available for UK nationals or EU nationals who have lived in the UK for over 3 years (EU nationals not resident in the UK are only eligible for fees element). Further information regarding DfE studentship eligibility criteria can be found at: http://www.qub.ac.uk/graduate-school/funding-scholarships/uk-eu-prospective-research/ .
Duration	3 years
Application Deadline	Ongoing
Anticipated Start Date	October 2020
<p>Project description:</p> <p>With the drive towards 2050 'net zero' targets, the elimination of tailpipe emissions in the public transport sector remains a key goal. However, while there has been significant activity in the electric vehicle domain over the last decade, research into hydrogen-based solutions is less mature. As pointed out in the UK Road to Zero strategy (published 2018), the UK is well positioned to be "a global leader in hydrogen and fuel cell powered transportation", but this will require both significant research effort and investment to achieve this ambition.</p> <p>Local to Northern Ireland, Wrightbus has been leading global development of fuel cell vehicles for the bus sector, announcing plans to deliver up to 3,000 new hydrogen powered buses over the next four years (April 2020). However, in order to fully exploit these technologies, there is a need to fully understand the way in which these new vehicle will behave across a range of operating environments, how systems such as the fuel cell and battery interact, and how the performance of the vehicle may change across the lifespan of the vehicle. The team at Queen's University Belfast have extensive experience in modelling and performance analysis of a range of bus vehicle types (diesel, hybrid and electric) and the current PhD will join the team to further develop expertise in the modelling of fuel cell electric configurations, and deliver cutting edge research in this field.</p> <p>Key Objectives:</p> <ol style="list-style-type: none"> 1. To understand the state-of-the-art in fuel cell electric vehicle technologies, with a specific focus on their use in the public transport sector. 2. To develop a flexible modelling environment which can be used to develop driving cycle models of the fuel cell electric buses, encapsulating both single and double deck bus architectures. 3. To use the environment to establish performance envelopes for operation of these vehicles, and to understand the impact of factors such as usage profile and aging. 4. To propose and implement novel control algorithms for the vehicles which can be used to provide 'lifecyle optimal' system usage. 	
<p>Key skills required for the post:</p> <p>A minimum degree classification of 2:1 (or equivalent) in one of the following areas is required: Engineering, Science, IT, Mathematics or a closely related subject area. A Masters level qualification (MEng/MSc) is preferred, and while other qualifications may be accepted, candidates who do not hold a Masters level qualification should clearly demonstrate their equivalent experience. Candidates must be able to demonstrate a significant level of mathematics and/or data analysis in their primary degree area.</p>	

It would be desirable to have some understanding and knowledge in the areas of automotive engineering and data analytics.

Good computer skills are desirable, as the project will involve computer modelling, simulations and analysis of results.

Key transferable skills that will be developed during the PhD:

The key transferable skills that will be developed during this PhD project will be in the areas of:

- Matlab/Simulink and Excel based modelling
- Possibly Experimental Testing and Analysis

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