Acadamh Ríoga na hÉireann
Royal Irish Academy

Royal Irish Academy Grants Report

Title:	Dr
First Name:	Iain
Surname:	Moyles
Discipline:	Sciences
Year of Award:	2018
Project Title	Mathematical modelling of thermally induced catastrophic failure of lithium-ion batteries

1. Research background:

My research is in applied mathematics. Specifically, I work in asymptotic and numerical methods for solving problems in natural sciences. One of my main focuses is in industrial mathematics which involves solving problems of scientific importance to companies, governments, and other enterprises.

2. Please outline the findings of your research and/or milestones achieved (did you achieve the primary objectives - if not, what did you learn from the process)?

We are currently preparing two manuscripts. The first manuscript involves the derivation of the thermal model and the analysis of the dominant heat generation mechanisms. We are planning on submitting that to the Journal of Power Sources (Impact Factor [IF]: 6.4). The second manuscript is the analysis of heat generation with the short-circuit behaviour included. That will be submitted to the International Journal of Heat and Mass Transfer (IF: 3.5). I am also organising two minisymposia at international conferences on batteries where the results of the Charlemont Grant will be presented. First I will be presenting at the Canadian Applied and Industrial Mathematics annual meeting in Whistler, Canada in June

2019. Secondly, I will be presenting at the International Congress on Industrial and Applied Mathematics in Valencia, Spain in July 2019. This latter meeting is a major international event for applied mathematicians and the minisymposia I am organising and presenting in has sixteen invited speakers from several countries and institutions.