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To whom it may concern,

I have a long track record (+10 years) of using mathematics, computing and programming to understand and bring meaning to real world problems. My key asset is my very broad skill set, and ability to turn my mathematical/computing skills to any problem in a short space of time. I have very good Python/C/Linux tool chain programming skills (see github profile). In the past I have programmed Pascal/ Fortran/Delphi/ Basic/ VB/C++/ARM assembler/PIC assembler/Z80 assembler/MATLAB. In general I can pick up any programming language/API within a few days. I also have some experience in using SQL databases (mariadb). I hold a PhD which focused on solving physics problems with mathematical methods. I have a strong drive to learn and improve. Many of the problems I solve take significant tenacity, as there often exists no standard way of solving the problem. I have significant experience in working in large international collaborative teams of scientists, I enjoy working with people in a team and find it rewarding.

I have used my mathematical computer modelling skills to solve problems as varied as; 1) feature vector extraction from Arabic handwriting (for improving hand writing recognition algorithms); 2) developing computational models to understand lasers used in cancer therapy/inter-satellite communication; 3) writing models/algorithms to design better solar cells for harvesting energy from the sun; 4) using computational methods for designing better materials for electronic devices; and 5) using data mining techniques to understanding how Members of Parliament interact with the public through Twitter. Most of these activities required the development of large custom code bases, which ran on super computer platforms.

I am author of and manage the open source project *General-purpose Photovoltaic Device Model* (git hub: https://github.com/roderickmackenzie/gpvdm) This is the worlds only open source computational model for simulating solar cells, it has ~20,000 downloads to date and consists of ~50k lines of Python, ~50k lines of C. The large user base forces me to use a risk adverse development strategy when rolling out new features. The code ships as source code, via a windows installer, .deb files and .rpm files for all major distros. It has also been translated into Chinese and Russian by the community. Mathematically, the most challenging part of the model was developing

algorithms to solve the highly non-linear set of equations needed to simulate the solar cells.

Recently I have been using Machine Learning (Neural Networks/Tensor flow) to understand the physical reasons as to why some novel materials for the next generation of solar cells perform well and some perform poorly. This work has been performed in collaboration Merck Chemicals Ltd, Southampton and Prof. Carsten Deibel at the Technical University of Chemitz, Germany. To facilitate this work I have won a NVIDIA GPU grant, which provided me with a high end GPU to train the models. I have recently written a UK Research and Innovation grant which came 9th out of ~100 applications, on using machine learning to more efficiently develop the next generation of solar cell.

In my capacity as Data Science adviser to the UK parliament, I am building a system to harvest all the tweets issued by members of parliament, store them in an SQL database to better understand how MPs interact twitter. My code is categorizing them based on subject, and sentiment with the aim of building up a picture of each MPs interests, and predicting workload demand of the Parliamentary Science and Technology Office.

Throughout all my work, I closely interact with scientists who provide me with real world data. I therefore have considerable experience in writing algorithms to pre-process real world data. I have experience in visualizing the results of my work (generally matplotlib), and experience in User Interface design (QT), these skills would enable me to interact with experts on visualization.

Yours sincerely,

Roderick MacKenzie MEng, Ph.D