

Over the course of studying for the MSc in Bioinformatics, Polyomics and Systems Biology at Glasgow I have become fascinated by the potential knowledge lying untapped within the petabytes of accumulated biological data. Studying machine learning in the “Systems Biology approaches to Omics Data Analysis” module has really sparked my interest in the potential of applying methods established from other big data domains to glean information from the data in biomedical research. I am really keen to develop my expertise in this field and have chosen to do my summer project in this area.

During this MSc I have gained a good understanding of polyomics approaches to biology. This has included experimental design and practice in metabolomics and the challenges faced in data interpretation. We also got practical experience of a wide range of omics pipelines including metagenomics, RNA-Seq and integrative analysis of different levels of omics data to study drug resistance. I have particularly enjoyed having access to PubMed enabling me to delve deeper into the subject areas. Coming back to study for a second time I find it very different, I understand that my strengths lie in my propensity to dig deeper into material we are learning and in my preference to understand the underlying concepts of everything I learn. Throughout my studies and research jobs I have studied a very broad range of subjects including molecular biology, physics, mathematics, electronics and chemistry. I feel these attributes and knowledge have given me the ability to quickly grasp the concepts and understanding of a new topic but also to see the bigger picture drawing in ideas from a wider perspective.

I have strong analytical and problem solving skills and enjoy applying to solving complex computer problems. Most recently studying Java has allowed me to get to grips with using object oriented programming to develop programs in a more modular and structured way. Before signing up to the Bioinformatics MSc I took part in Pavel Pevzner's MOOC “Bioinformatics Algorithms” which I completed in Python. This set challenging bioinformatics problems that had to be solved with code that could run within strict time limits forcing you to use the optimal algorithm available. One of the tasks was to sequence a cyclic peptide antibiotic from mass spectroscopy fragmentation data. Whilst working on the TOPFIT project in molecular electronics I developed a pattern recognition program for analysing images for Scanning Tunnelling Microscope. I developed code for a “synergetic nonlinear dynamical systems” algorithm, learning a new language (C) on a new platform (Mac pre IOS) with no online libraries or stack overflow. Although this was successful on a subset of data available dealing with the complex artefacts and biases of STM was beyond the scope of my project, (50% of a two year contract).

I feel very privileged to have had this opportunity to return to studying full time with the aim to restart my career in science. I have a high level of motivation to succeed and have put in the hard work to prove myself receiving A's and B's for all but my first assignment. I am committed to making the most of any opportunity to learn and to progress my career in research. Having made this decision I have found that even when course has been particularly onerous with many competing priorities, such as multiple assignment deadlines and impending exams I have enjoyed putting in the very long hours necessary to succeed.

I am very keen to be part of this Doctoral Training Program and see this PhD as an amazing opportunity be trained in both Machine Learning and Precision Medicine and to gain vital research experience in a cutting edge area. I believe that machine learning and statistical approaches to interrogating biomedical data will be fundamental to the success of this field. This is a really exciting time to be starting a research career in Precision Medicine with the Catapult initiative and major global investments in this field. This means that the potential for precision medicine to transform healthcare and make a real difference to patient outcomes will soon be realised.