Smith institute

Using maths to take on the deadliest cancer – glioblastoma

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Of all the cancers afflicting the human body, Glioblastoma a malignant brain cancer is the deadliest. Once someone is diagnosed with Glioblastoma, they will die, and soon. The majority of patients die within 14 months of diagnosis and 95% die within 5 years.
Since the development of the chemotherapy drug Temozolomide (TMZ) over two decades ago, there has been no significant development of any other treatment, TMZ still remains to be the only FDA-approved drug to treat Glioblastoma.

This deadly disease is characterised by extreme genomic instability, even by standards of cancer cells, that what appears to be one single tumour is often a large collection of various different cell types, using different mechanisms to grow, survive and resist drug treatments which has proven to be a major hurdle in the efficacy of patient treatment.

Recent advances in data science have raised the prospect of identifying the root of drug resistance and stopping tumour recurrence. That is where my research in the field of Gene Network Analysis comes in. Using mathematical modelling and large amounts of genetic data derived from patients' tumours, my research aims to identify the genes which are driving drug resistance and tumour recurrence. Identifying these genes could in turn lead to more effective personalised methods of treatments based on the genetic variation within a patients' tumour. Raising hopes of a better prognosis for patients and more months or years of life post diagnosis.