Personalised approach to Complex Disease

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EPSRC PhD studenship application

Huge Impact of Complex Disease

Economic cost of Coronary Heart Disease – 7.09×10^9 GBP/year in UK [1]

Spending on Cancer is now globally 100×10^9 USD/year [2]

Even very rare Complex Diseases have significant socio-economic impact ~ 40×10^9 USD/year in US [3]

1. Liu JLY, Maniadakis N, Gray A, Rayner M. The economic burden of coronary heart disease in the UK. *Heart*. 2002;88(6):597-603.
2. IMS Institute. *Developments in Cancer Treatments, Market Dynamics, Patient Access and Value*. Global Oncology Trend Report. 2015. http://www.imshealth.com/reports/global-oncology-trend-2015
3. KuicK Research. Global Orphan Drug Market Outlook. 2015 http://www.orphan-drug.com/buy-report.php?reporttitle=US-Orphan-Drug-Market-Outlook-2018

Complex Disease is hard

Unfulfilled expectations of GWAS (methodology)

Interdisciplinary approach needed involving medicine, statistics, computational biology, biochemistry, biotechnology, environmental science, and many more

What appears to be one disease can actually be a group of diseases.

Machine learning to answer questions from data

We need to be realistic. Good approach can come from simpler diseases.

Myotonic Dystrophy

World class research at Glasgow

Relatively well-understood genetic causes

Analytical methods can be improved by using appropriate classification algorithms from machine learning as opposed to binary case/control paradigm.

Why me?

Experience with Statistical Software (Certified SAS programmer, 1 year experience working at SAS Scotland R&D)

Joint Honours Maths + Computer Science

An article on bacterial membrane composition published in Journal of Analytical Chemistry [1]

A dissertation on the effect of evolution on relatedness at University of Glasgow graded excellent [2].

Numerous software projects including algorithmic, scientific, systems, web application, desktop application & scripting programming.

1. Kurkiewicz S, Kurkiewicz A. Profiling of bacterial cellular fatty acids by pyrolytic derivatization to 3-pyridylcarbinol esters. *Journal of Analytical Chemistry*. 2015;70(10):1225-1228.
2. The effect of natural selection on relatedness in randomly mating population. https://github.com/picrin/naturalSelection/blob/master/dissertation/l4proj.pdf