ESR VISION Post Graduate Scholarship

Obesity informatics: visualisation and analysis tools for genomic and epigenomic data

Research Proposal

Obesity poses a significant public health and economic burden in NZ and worldwide and is a risk factor for various cancers as well as metabolic diseases such as type-two diabetes, hypertension, and cardiovascular disease. Not only are these chronic conditions the leading causes of ill-health and early death in New Zealand, but they disproportionally affect Māori and Pasifika, account for over 70% of health system costs and are NZ Ministry of Health priorities.

Gene environment interactions play an important role in complex disease pathogenesis. The mechanisms involved in this interaction are termed epigenetic. The project will investigate epigenetics in obesity and related metabolic disease, concentrating on the tractability of epigenetics as a disease marker, and DNA methylation in particular. This heavily computational project will be performed *in silico* and will focus on the handling and analysis of large data sets - methodology development, data integration (genomic/epigenomic and clinical), analysis and visualisation.

The project will utilise data generated from a unique NZ resource, The Wakefield tissue bank, and use gastric bypass as a model in which to study obesity and weight-loss. Samples available from patients before and after gastric bypass and the associated depth of clinical data are rare, making this an extremely valuable resource. The research work and collaborative networks of the extended team (Macartney-Coxson, Black and Benton) will provide access to additional patient cohorts including those with a significant Māori and/or Pasifika component.

Additional "omic" datasets (such as SNP and RNA transcription information) are available for integration into the analyses, as are other public and collaborative datasets

You will develop important computational, analytic and visualisation skills, along with the ability to work within a reproducible research framework. As part of a small and highly collaborative (nationally and internationally) team you will also gain experience in collaboration and research partnership, and will be encouraged to be an active member of the relevant professional NZ networks. Previous programming experience (preferably R or Python) will be highly advantageous, as will familiarity with statistical and machine learning concepts.

For further information please contact

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The ESR Vision PhD Scholarship consists of a NZ$27K stipend per annum for 3 years (tax free), and payment of University of Otago PhD student fees.