

PhD Project Advertisement

Project title: Integrating nutrigenetics, metabolomics, diet, lifestyle, and clinical, biochemical, and social parameters in predicting the risk of metabolic diseases and related traits using artificial intelligence based on machine learning algorithms.

Project No: FBS2024-059-Karani-rs

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Project description:

This is an exciting opportunity to develop and conduct research at the forefront of nutritional and genetic epidemiology, contributing to the prediction, prevention, and better understanding of the development of non-communicable diseases such as obesity and diabetes, using datasets from multiple ethnic groups. Our community of researchers have diverse skills and work together on exciting interdisciplinary research projects using data and samples from leading large cohort studies such as UK Biobank.

Many people live with multiple health conditions, but research still tends to focus on individual diseases. This project focuses on two global public health problems with a complex etiology: obesity and diabetes. The student will become an expert in nutrigenetics of metabolic diseases through training at two world leading centres (Reading and Surrey) and will utilise global studies to determine and predict the risk of developing metabolic diseases.

The focus on diverse populations is a key priority area for genetic and nutritional epidemiology. There is growing interest in the development of prediction models for metabolic disease risk, but huge research gaps remain, especially in diverse ethnic groups. This PhD project addresses these issues by focusing on six ethnically diverse populations (UK, India, Malaysia, Peru, Brazil, and Ghana). The student will use cutting-edge genetic epidemiological methods to investigate gene-diet interactions in ethnically diverse populations – both across the UK and across multiple global settings.

The objectives of this project are to enable metabolic disease risk prediction, to facilitate the identification of at-risk individuals and to promote disease prevention and early detection. The two specific aims of this project include: 1). To identify nutrigenetic and metabolomic markers specific for each ethnic group using large datasets, and 2). To integrate these identified genetic and metabolomic biomarkers and conventional risk factors such as diet, lifestyle, and clinical, biochemical, and social factors into prediction models to determine the risk of developing metabolic diseases using artificial intelligence-based machine learning tools.

Training opportunities:

We believe this PhD will provide an excellent platform for a successful scientific career, focusing on three high priority research areas: nutrigenomics, artificial intelligence, and metabolic diseases. Throughout the programme, you will benefit from supervision by highly regarded academics in a dynamic research environment.

The first year is designed to offer you opportunities to investigate core subject areas, such as genetic and nutritional epidemiology, nutrigenetics and nutrigenomics and statistics at the University of Reading. You will complete a module on 'Lifestyle, Nutrigenetics and Personalised Nutrition' tailored to your training needs and attend a series of short courses and workshops pertaining to statistical genetics and precision nutrition.

In the year 3, you will receive training on machine learning approaches at the University of Surrey. There will be an opportunity to work with a group that has a strong track record in nutritional and genetic epidemiology and to develop links with experts nationally and internationally.

You will be expected to actively participate in group meetings such as journal clubs and department seminars. In addition, you will be encouraged to attend relevant conferences to enrich your studies and financial support will be made available for travel to conferences.

Student profile:

We are looking for applicants who hold or expect to hold an undergraduate degree (or equivalent) from a range of disciplines e.g. molecular biology, biotechnology, genetics, nutrition, epidemiology, public health, biostatistics, biochemistry, social science, engineering and computer science.

Stipend (Salary):

FoodBioSystems DTP students receive an annual tax free stipend (salary) that is paid in instalments throughout the year. For 2023/24 this is £18,622 and it will increase slightly each year at rate set by UKRI.

Equality Diversity and Inclusion:

The FoodBioSystems DTP is committed to equality, diversity and inclusion (EDI), to building a doctoral researcher(DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the [FoodBioSystems DTP website](#).

In accordance with UKRI guidelines, our studentships are offered on a part time basis in addition to full time registration. The minimum registration is 50% FT and the studentship end date will be extended to reflect the part-time registration.

References:

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- Jin H, Wu S, Vidyanti I, Di Capua P, Wu B. Predicting depression among patients with diabetes using longitudinal data. *Methods of Information in Medicine*. 2015;54(06):553-9.
- Jin H, Wu S, Di Capua P. Development of a Clinical Forecasting Model to Predict Comorbid Depression Among Diabetes Patients and an Application in Depression Screening Policy Making. *Prev Chronic Dis* 2015;12:150047.

For up to date information on funding eligibility, studentship rates and part time registration, please visit the [FoodBioSystems website](#).