Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Structured PhD Position in Statistics (4-years full-time)

Project title: T-DIET - Developing novel statistical methods for the analysis of longitudinal dietary patterns and their association with health outcomes

Project supervisor: Dr. Silvia D'Angelo (Trinity College Dublin).

Project locations: Discipline of Statistics and Information Systems, School of Computer Science and Statistics, Trinity College Dublin.

Application deadline: 30th April 2025

Start date: 1st September 2025

PhD structure: This is a full-time 4-year structured PhD project, based in the Discipline of Statistics and Information Systems at Trinity College Dublin. The funding for the project includes a tax-free stipend along with expenses for computing equipment, conference travel and materials. Fees are provided for in the funding.

PhD topic: The T-DIET project will develop novel statistical methodology to enable inference on dietary patterns, i.e., groups capturing different diets in a population, from longitudinal food intake data. The framework will rely on an Hidden Markov model (HMM), a type of latent variable model allowing to infer unobserved groups underlying longitudinal data, the dietary patterns. Further, it will allow one to model, in probabilistic terms, individuals' adherences to such patterns, permitting changes of diets over time, and directly quantifying uncertainty. Various complexities will be addressed, such as the compositional nature of intake data, or the incorporation of prior information available in the Nutrition literature on dietary patterns, e.g. their qualitative ordering. The methodology will be extended to incorporate the HMM into a quantile regression framework, to investigate the relationship between dietary patterns, individuals' adherence to such patterns, and health outcomes. The quantile regression framework will analyze relationships at all levels of health outcomes, and not only on average, as in standard regression approaches. The statistical method-

ology developed in the T-DIET project will have widespread potential application in the field of nutritional epidemiology. Last, open-source software implementing the methodology will be made available, to allow for its wide and feasible usage.

The Institution: The School of Computer Science and Statistics at Trinity College Dublin is a collegiate, friendly, and research-intensive centre for academic study and research excellence. The School has been ranked 1$^{\text{th}}$ in Ireland, top 25 in Europe, and top 100 Worldwide (QS Subject Rankings 2018, 2019, 2020, 2021, 2023).

Requirements: Applicants should have (or expect to attain prior to project start) at least a 2.1 honours degree or equivalent in the areas of mathematics, applied mathematics or statistics. Applicants must demonstrate proficiency in statistical modelling and have some experience with statistical computing through R, python or C. Applicants for whom English is a second language will be required to demonstrate their competence in the English language in line with Trinity College Dublin requirements as appropriate.

Funding notes: Stipend of €22,000 per year for four years, with budget for travel and laptop. Fees for Home/EU students will be covered automatically, while non-EU students will receive a fee waiver from the university.

Application: Applicants should email Dr. Silvia D'Angelo (dangelos@tcd.ie) to apply. The application should include a 2-page comprehensive CV, academic transcripts of the degree/ degrees, and a short cover letter/statement of purpose (2-pages max) indicating how their skills align with the project and their motivation for applying. Please include "PhD Application (T-DIET)" followed by your name in the subject line. The application CV should, at minimum, include the applicant's name, educational institution, qualification stating overall grade/percentage (predicted grades are acceptable for those still studying) and contact details of two academic referees. Informal queries can be made to: dangelos@tcd.ie. Please include "PhD Query (T-DIET)" followed by your name in the subject line.