FACULTY SCIENCE

Mathematics & Statistics

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Two Postdoctoral Fellowships in mathematical/statistical modelling of the COVID-19 pandemic at York University, Canada

Background

During different phases of the COVID-19 pandemic, real-time delivery of reliable and comprehensive information is critical to predict spread and impact, and to guide governmental strategic policies and best practice. This requires rapid transfer of current epidemiological data to strategic action plans for a phased transition from widespread transmission to a steady-state of low-level or no transmission. To this end, the Laboratory for Industrial and Applied Mathematics (LIAM) (https://liam.lab.yorku.ca), the Dahdaleh Institute for Global Health Research (https://dighr.yorku.ca) and the Advanced Disaster, Emergency and Rapid Response Program (ADERSIM) (https://adersim.info.yorku.ca) at York University with support from the International Development Research Centre (IDRC) have joined forces with epidemiologists, modelers, physicists, statisticians, software engineers and data scientists across Africa under the leadership of Jude Dzevela Kong (http://www.judekong.ca), to develop state-of-the-art statistical and mathematical methods to analyze epidemic data, with the aim to increase our understanding of how pathogens spread in populations, assess the impact of interventions, support policy making and optimize control strategies. Our approach is highly multidisciplinary, looking at infectious diseases through multiple perspectives, multiple scales and multiple data streams. We work closely with public health agencies both in Canada and Africa to ensure our assessments can inform the public health response to epidemics.

Since the start of the COVID-19 pandemic, LIAM, ADERSIM and the Dahdaleh Institute for Global Health Research have been heavily involved in the Canadian response to the pandemic, providing modelling support to the Canadian Government to inform policy making and planning.

Job description

We are seeking 2 Post-Doctoral Fellows to contribute to the IDRC sponsored COVID-19 related research projects. The projects include: applying artificial intelligence to develop advanced visualization and analytics tools that will assist policy makers; now-casting and forecasting of COVID pandemic to inform healthcare planning; determine initial disease spread characteristics within communities prior to use of non-pharmaceutical interventions (NPI); employ mathematical models to examine NPI effectiveness, for example, the effect of a home quarantine policy, social distancing interventions, tracing apps, testing and isolation on the epidemic development; determine NPI effects on healthcare demand; determine the effects of vaccination on the NPI uptake needed for post-vaccine waves of infection; develop an overarching economic-epidemiological model for scientists and policy-makers; build spatial disease spread models and simulations for the outbreak of COVID-19 at a localized level to model the effects of informal settlements and varying social distancing practicalities in townships, performance of hotspot analysis, and the identification of vulnerable areas; analyses of outbreak data in specific settings (e.g. households, hospitals).

The Post Doctoral Fellows will be expected to work with and develop state-of-the-art statistical and mathematical methodology. The exact projects that each

successful applicant will undertake will be determined in discussion with the team, taking into account the applicants' interests and experience.

The Post Doctoral Fellows will be jointly supervised by Professor Ali Asgary, Faculty of Liberal Arts & Professional Studies, and the Executive Director of ADERSIM, Professor James Orbinski, Faculty of Health, and Founding Director of the Dahdaleh Institute for Global Health Research, Professor Jianhong Wu, Faculty of Science, Director of LIAM and Leader of the National COVID-19 Modeling Rapid Response Task Force and Professor Jude Dzevela Kong, Faculty of Science.

Interested candidates should contact Jude Dzevela Kong (jdkong@yorku.ca) with a CV, statement of interest and contact details of two referees that will be contacted directly after the interviews. The positions will remain open till January 01, 2021 with contracts starting as soon as possible.

Salary: The salary is approximately $48,500 per year including $8,250 for a course instructorship. The salary will be adjusted for those candidates preferring no course instructorship. The salary could be complemented by other funds including those from external sources awarded to the applicants.

Person specification:
1) Research experience of working with mathematical and/or statistical models.
2) A strong interest in infectious disease epidemiology.
3) Ability to collect and analyze data, interpret and present results to a high standard using a range of specialized research techniques.
4) Good knowledge of python/MATLAB/R programming language.
5) Programming experience or familiarity with agent-based modeling, and simulation with Anylogic and geospatial analysis and modelling
6) Excellent verbal and written communication skills.
7) Experience in communicating research findings to a non-specialist audience.
8) Ability to work independently but also as part of a larger interdisciplinary research team.
9) PhD in one of the following areas: infectious disease epidemiology, mathematics, statistics, physics, computer science, population biology or a similarly quantitative discipline.

Equal Employment Opportunity Statement

York University is an affirmative action and equal opportunity employer. All qualified applicants will receive consideration for employment without regard to race, color, creed, religion, national origin, sex, sexual orientation, marital status, pregnancy, genetic information, gender identity or expression, age, or disability.

Commitment to Diversity
York University is committed to building diversity among its faculty, librarian, staff, and student communities (https://hr.info.yorku.ca/diverse-equitable/).