



Postdoctoral Fellowship

School of Public Health Sciences, University of Waterloo

Focus

Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. This postdoctoral fellow will apply data mining, data modelling, natural language processing, and machine learning to extract, analyze and synthesize information from large structured and unstructured datasets. This person will visualize, interpret, and report data findings and create dynamic data reports.

Opportunity

The [Aging and Innovation Research Program \(AIRP\)](#), led by [Lili Liu](#), focuses on acceptance and adoption of innovations by older adults, their care partners, and health care professionals. Innovations can include technologies, practices, and policies. A large portion of this research program focuses on technologies for the assessment and management of risks of going missing in persons living with dementia. This includes developing, applying, and evaluating individual and community-level strategies to foster dementia-friendly communities. This position will be supervised by [Antonio Miguel-Cruz](#), Adjunct Assistant Professor in the School of Public Health Sciences, Faculty of Health.

Project summary

This project aims to analyze existing data from different sources and partners to understand missing person incidents and lost person behaviour specific to persons living with dementia in Canada. This individual will develop a high-performance computing infrastructure to support computer applications like real-time dashboards and monitoring strategies to achieve this project's objectives.

The postdoctoral fellow will work with a research team to design and develop different machine learning applications, including neural networks, to predict and mitigate risks. The postdoctoral fellow will also propose strategies for creating databases, data warehouse systems, and multidimensional networks and will set standards for database operations, programming, query processes, and security. The postdoctoral fellow will model, design, and construct large relational databases or data warehouses and create and optimize data models for warehouse infrastructure and workflow, integrating new systems with existing warehouse structures to refine system performance and functionality.

The postdoctoral fellow is expected to participate in systematic and scoping literature reviews and support ongoing research projects in aging, innovation, and technology development. The candidate will also participate in primary data collection, including conducting surveys and interviews and data analysis. Research activities will include collaboration with partner organizations, academics, and students within and

beyond the research program.

Tasks

- Analyze, manipulate, or process large sets of data using statistical software.
- Apply feature selection algorithms to models predicting outcomes of interest, such as sales, attrition, and healthcare use.
- Apply sampling techniques to determine groups to be surveyed or use complete enumeration methods.
- Clean and manipulate raw data using statistical software.
- Compare models using statistical performance metrics, such as loss functions or proportion of explained variance.

Desirable technology skills

- Analytical or scientific software, such as: IBM SPSS Statistics; or Minitab; or SAS Hot technology; or R (R Studio Server) or Python.
- Data base management system software, such as: — Amazon DynamoDB; Apache Solr; Elasticsearch; MongoDB, SQL and No-SQL Databases.
- General software — Microsoft 365, Adobe cloud suite.
- Design and visualization software and frameworks, such as: Tableau, Exploratory.io, and ARCGIS.

Communication

- Communicate with staff and partners to understand specific system requirements.
- Write detailed functional specifications that document the hardware development process and support hardware introduction.

Research

- Identify complex problems and review related information to develop and evaluate options and implement solutions.
- Use logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- Prepare grant applications, research protocols, manuscripts, technical reports, and presentations to academic and non-academic audiences.

The successful candidate will join a multidisciplinary research team led by Professor Lili Liu and will be supervised by Professor [Antonio Miguel-Cruz](#). The job involves independent and proactive work and supervision of students and research assistants (casual, staff and volunteer), and collaboration with other researcher and project team

members. Thus, the successful candidate is expected to work in multidisciplinary and multi-stakeholder projects.

Requirements - the ideal applicants for this position will have:

- A PhD degree, within four years of completion, in statistics, actuarial science or data analysis related sciences (i.e. Epidemiology, Biostatistics, Bioinformatics, computer science or related fields). And an in-depth understanding of data structures and data analysis.
- Excellent written and oral communication skills to facilitate the development and maintenance of successful relationships with partners, colleagues, and students.
- Critical thinking and cognitive skills, including deductive and inductive reasoning and creative problem-solving.

Application process

Interested applicants should [email Cathy Conway](#) with a cover letter that describes career aspirations, a current CV, a one-page research statement, the earliest starting date, and the contact information of three references who will be contacted only after permission from the candidate is granted. Only the selected candidates will be contacted for interviews.

The institution

The [Faculty of Health](#) is committed to improving the quality of life for individuals and communities through innovative education and research activities. The Faculty of Health (formerly Applied Health Sciences) is a leader in developing strategies that prevent disease and injury, protect and promote healthy living, optimize physical ability, and improve well-being across the life course.

The [School of Public Health Sciences](#) at the University of Waterloo is training a new generation of leaders, researchers, and change agents adept at thinking and responding to the complex adaptive systems that affect health and health care. Together, we are seeking innovative solutions to some of the significant health challenges of our time: chronic disease prevention and management; health and ageing; health care system integration, management and informatics; food and water safety, security and governance; health inequity, including poverty and Indigenous health issues; and health and the environment.