

Project Title:  
**Applied Machine Learning in Data-Driven Healthcare**

**Supervisor:** Prof. Mark Chignell

**Application:** Please submit CV, unofficial transcript, and a single paragraph describing your interest in the project in one file in a single email to Prof. Mark Chignell at [chignel@mie.utoronto.ca](mailto:chignel@mie.utoronto.ca) and Dr. Lu Wang at [wanglu.wang@mail.utoronto.ca](mailto:wanglu.wang@mail.utoronto.ca). Please let us know your availability to do work over the next year.

**Project Description:** Healthcare systems are changing in the era of big data. Advances in artificial intelligence (AI) in healthcare make it possible for healthcare providers to sift through tremendous amounts of information efficiently, extracting knowledge in the form of classifications, predictions, and causal relationships that can improve clinical decision making. There are various types of health information ranging from medical literature to pathology reports that can be used in analyses. In our projects we develop and apply Machine Learning (ML) methods that can efficiently utilize Electronic Health/Medical Records (EHRs/EMRs) and other proprietary data to facilitate decision making of physicians in their clinical practice.

In addition to ML methods, we also consider Human-Centered AI (HCAI) for Data Driven Decision Making (D3M) addressing healthcare/medicine problems. Our lab has multiple projects available in the general area of applied data science in healthcare. Interactive Machine Learning (iML) improves ML *prediction* by including human experts in the learning process and integrating human expertise. eXplainable Artificial Intelligence (XAI) and trustworthy AI in healthcare systems are further areas of interest where the goal is to not only improve the uptake of ML models but to also increase physician *trust* in ML predictions so that they can be used in clinical decision making.

In this project, you will have opportunities to work with real healthcare and medical data including EHRs/EMRs for multiple cognitive disorders and chronic diseases collaborating with physicians, clinicians and psychiatrists, etc. Areas of active investigation include prediction of delirium (acute brain failure) in elderly hospital patients, choosing different anti-depressant drugs based on depression symptoms in patients, and development of software tools to improve human interaction with machine learning tools and outputs. We expect that successful candidates will have the opportunity to co-author scientific publications on the work carried out.

**Start date:** Summer/Fall 2022 (we would like the right people to start as soon as possible)

**Research area:** Data science, machine learning, artificial intelligence, healthcare, medical research.

**Requirements:** Successful candidates must be willing to work under the direction of Lu Wang and our team and officially register for an Meng Project, carrying out that project to completion.