### FROM MODELLING HEALTHCARE SYSTEMS TO OPTIMIZING PATIENT TREATMENTS

We pioneer data-driven research to improve system efficiency and enhance patient care.

Healthcare costs are growing rapidly, and they constitute the single largest expense for provincial and territorial governments across Canada. Fortunately, we are in the midst of a big data revolution in healthcare, which will enable engineers to develop data-driven, quantitative and evidence-based solutions to problems from health systems performance improvement to medical decision-making. Engineers have always tackled significant and challenging problems facing society. Healthcare needs us now.

The Centre for Healthcare Engineering (CHE) at the University of Toronto was established in 2008 to bridge academic research in engineering with healthcare practice. Today, CHE is a leader in interdisciplinary research and education in healthcare engineering. The Centre comprises faculty and students from across the University whose research is directly impacting healthcare organizations and partners in practice.

As part of a new growth plan, CHE is seeking philanthropic and industry investment that will enable our researchers to make significant and lasting impact in healthcare. The Centre intends to establish an Endowed Chair in Healthcare Engineering and expand opportunities to engage talented visiting scholars, post-doctoral fellows and graduate students who will fulfill the vision of the Centre. To learn more, please contact us at che@utoronto.ca.

### ENGINEERING A BETTER HEALTHCARE SYSTEM

Cover image: Professors **Timothy Chan** and **Dionne Aleman** develop algorithms to optimize the effectiveness of radiation therapy treatments.

**CENTRE FOR HEALTHCARE ENGINEERING** 5 King's College Road, Toronto, ON M5S 3G8, Canada

WWW.CHE.UTORONTO.CA



### **OUR CENTRE**

The **Centre for Healthcare Engineering (CHE)** at the University of Toronto provides a bridge between academia and the healthcare sector, translating the latest research findings to impact practice and offering educational opportunities for students and practitioners.



"The Centre for Healthcare Engineering aims to be a world-class centre that pioneers research in healthcare engineering, attracts and develops exceptional people, and helps healthcare organizations make significant and lasting improvements. Our researchers are solving today's most challenging problems in medical decision-making, healthcare policy design, delivery and operations. It is truly an exciting time to be a healthcare engineer."

Professor **Timothy Chan** Former Director, Centre for Healthcare Engineering

#### **OUR PARTNERS**

Alberta Bone and Joint Health of Medicine Institute Alberta Health Services Bridgepoint Hospital Health Canada Health Infoway Cancer Care Ontario Centre for Addiction and Mental Health Concordia Hospital, Winniper Hamilton Health Sciences Kingston Public Health Centre Li Ka Shing Knowledge Institute

Memorial University, Faculty St. Michael's Hospital Scarborough Hospital Mount Sinai Hospital Southlake Hospital Newfoundland Department of Statistics Canada Sunnybrook Health Sciences North York General Hospital Centre Ontario Agency for Health Toronto East General Hospital Protection and Promotion Toronto General Hospital Ontario Renal Network University of Saskatchewan, Ornge Medical Transport Faculty of Medicine Princes Margaret Cancer Women's College Hospital Robarts Research Institute

## **OUR RESEARCH**

CHE researchers develop solutions for a wide range of challenges in healthcare. Below are examples of our research projects:

A device that monitors gait for rehab, early detection of disease and assessment of fall risk from Professor **Mark Chignell's** Interactive MediaLab.



A patent-pending algorithm developed by Professor **Chi-Guhn Lee** analyzes blood pressure signals to forecast adverse events before they occur.

A simulation of pandemic disease spread to optimize public health strategies from Professor **Dionne Aleman's** Medical Operations Research Laboratory.



Statistical analyses by Professor **Birsen Donmez** and Ornge support the dispatch decision making process.

# **OUR STUDENTS**

CHE-affiliated students have the opportunity to work closely with faculty and other researchers. Some of our students and their projects are highlighted below:





Using simulation to optimize hospital portering operations Student: Carly Henshaw Supervisor: Professor Michael Carter



Using gaming to assess changes in cognitive status in conditions such as delirium Student: Tiffany Tong Supervisor: Professor Mark Chignell

#### EDUCATION

Taught by some of the most respected educators in the field, we offer a number of undergraduate and graduate courses in healthcare engineering, systems and policy, as well as fundamental engineering methodologies that are applicable to healthcare. At the graduate level, we offer a Master of Engineering (MEng) certificate in Healthcare Engineering, which includes specialized courses and an opportunity to work directly on an industry-directed project. For more information, visit www.discover.engineering.utoronto.ca (undergraduate studies) and www.gradstudies.engineering.utoronto.ca (graduate studies).

We also offer seminars, workshops and symposia throughout the year. Visit **www.che.utoronto.ca** for more details.

Designing emergency response systems in developing countries Student: Justin Boutilier Supervisor: Professor Timothy Chan



Investigating the effects of interruptions on nurses' working memory in intensive care units Student: Farzan Sasangohar Supervisor: Professor Birsen Donmez

www.che.utoronto.ca