Temerty Centre for AI Research
and Education in Medicine
UNIVERSITY OF TORONTO

Faculty Supervisors list

2023 T-CAIREM Summer Research Studentship Program

This list is intended for students who are applying for the 2023 T-CAIREM Summer Research Studentship Program. The University of Toronto faculty members in this list have indicated that they have one or more positions available for summer students.

Students who are interested in participating in the 2023 program may also directly contact other UofT faculty members not on this list to see if they are hiring summer students.

It is the responsibility of the student to arrange everything with a UofT faculty supervisor before the studentships start. The application deadline is 5pm on January 20, 2023.

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For more information about the 2023 program:
https://tcairem.utoronto.ca/call-student-researchers

We look forward to working with the successful applicants this summer. Good luck!

For more information contact:
Zoryana Salo
Centre Administrator
zoryana.salo@utoronto.ca • tcairem.utoronto.ca
Temerty Centre for AI Research and Education in Medicine (T-CAIREM)
Temerty Faculty of Medicine • University of Toronto

Last updated: 11 November 2022

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #1

POTENTIAL SUPERVISOR'S INFORMATION

Name	Phedias Diamandis
Phone number	(416) 340-4459
Preferred email address	p.diamandis@mail.utoronto.ca
Primary U of T department	Laboratory Medicine and Pathobiology
Appointment level	- Associate Professor

Supervisor's primary research interests
Computational pathology, neuroscience, brain, neurodevelopment, artificial intelligence, machine learning, pathology, computer vision

Website	https://diamandis.org

Briefly describe the research that the student(s) will be involved in.
Students will be involved in working with a team and helping develop and validate computer vision tools to carry out automated analyses of patient tissue in pathology environment.

Examples of possible applications include tumor classification, analysis of intra-tumoral heterogeneity, linking "histomic" markers with outcome and integrating ancillary tests (immunohistochemistry) with conventional H&E-stained images.

Specific skills you're looking for in summer student(s).
The projects are multi-disciplinary and include participants with strong skills in histology, biology, machine learning, and computer science.

Primary location of research	Princess Margaret
Where will the student's research be conducted?	In-lab

T-CAIREM membership
Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #2

POTENTIAL SUPERVISOR'S INFORMATION

Name	Sheena Josselyn
Phone number	(416) 813-7654
Preferred email address	sheena.josselyn@sickkids.ca
Primary U of T department	Psychology
Appointment level	- Full Professor
Supervisor's primary research interests memory, mouse, neural computation	
Website	https://jflab.ca/
Briefly describe the research that the student(s) will be involved in. The student would help conduct experiments and analzye data examining the activity of individual neurons as mice learn and remember experiences.	
Specific skills you're looking for in summer student(s). The student should have great math and data analysis skills, a general interest in AI and the brain. experience with Python.	
Primary location of research	Hospital for Sick Children
Where will the student's research be conducted?	In-lab
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #3

POTENTIAL SUPERVISOR'S INFORMATION

Name	Azadeh Yadollahi
Phone number	(416) 275-4315
Preferred email address	Azadeh.Yadollahi@uhn.ca
Primary U of T department	BME
Appointment level	- Associate Professor

Supervisor's primary research interests
Sleep, health equity, wearable devices, respiratory system, cardiac function, artificial intelligence

Website	https://sleepdb.ca

Briefly describe the research that the student(s) will be involved in.
We have a large database of physiological signals during sleep and wakefulness. Our goal is to develop novel machine learning algorithms to
1- Analyze the signals and predict clinical outcomes
2- Predict the risk of respiratory depression in those taking opioids
3- Investigate the type and severity of breathing problems during sleep
4- Estimate the severity of airway narrowing in people with asthma
5- Use this information to develop more accessible technologies to monitor physiological signals at home

Specific skills you're looking for in summer student(s).
Background in machine learning, or
Expertise with Python, or
Background in physiological signal recording, or
Background in digital technologies, or
Background in mobile app development

Primary location of research	University Health Network
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #4

POTENTIAL SUPERVISOR'S INFORMATION

Name	Sushant Kumar
Phone number	(814) 321-5730
Preferred email address	sushant.kumar@uhnresearch.ca
Primary U of T department	sushant.kumar@utoronto.ca
Appointment level	- Assistant Professor
Supervisor's primary research interests cancer genomics, computational biology, machine learning, precision oncology, cancer prevention	
Website	https://ccglab-uhn.github.io
Briefly describe the research that the student(s) will be involved in. We will build machine learning model to predict efficacy of treatment response in cancer patients by integrating genomics, clinical and biomolecular structure data.	
Specific skills you're looking for in summer student(s). programming, statistics, machine learning, cancer, genomics	
Primary location of research	Princess Margaret cancer centre
Where will the student's research be conducted?	Combination of both
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #5

POTENTIAL SUPERVISOR'S INFORMATION

Name	Somi Afiuni
Phone number	(647) 405-2264
Preferred email address	safiuni@lunenfeld.ca
Primary U of T department	Molecular Genetics
Appointment level	- TAHSN-affiliated Scientist

Supervisor's primary research interests
Machine learning, Spatial imaging, Digital pathology, Bioinformatics, Cancer research

Website	https://www.jacksonlabltri.com/

Briefly describe the research that the student(s) will be involved in.
Jackson lab is a systems biology and precision medicine lab located in the Lunenfeld Tanenbaum Research Institute. We investigate the multi-cellular structure and mechanisms of tissues and tumours with imaging using machine learning methods to advance digital pathology applications.
As a Staff data scientist and Computations manager at Jackson lab, we manage multiple projects/regarding data analysis pipelines which the research would be applying different algorithms in the existing data analysis pipeline for spatial imaging in cancer research applications.

Specific skills you're looking for in summer student(s).
Programming languages, Programming frameworks,
Quantitative research, Data analysis, Biology/pathology expertise

Primary location of research	LTRI (Lunenfeld Tanenbaum Research Institute), Mount Siniai Hospital
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #6

POTENTIAL SUPERVISOR'S INFORMATION

Name	Andrew Sage
Phone number	(289) 339-3741
Preferred email address	andrew.sage@uhn.ca
Primary U of T department	Toronto General Hospital Research Institute
Appointment level	- TAHSN-affiliated Scientist

Supervisor's primary research interests
The use of artificial intelligence during ex vivo organ perfusion and transplantation.

Briefly describe the research that the student(s) will be involved in.
- Real-time data acquisition and prediction of transplant patient outcomes
- Digital twin development during ex vivo organ perfusion

Specific skills you're looking for in summer student(s).
- Python, R, or similar programming
- Neural network programming (CNN, RNN, etc.)
- Medical/clinical experience in physiology

Primary location of research	Toronto General Hospital
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #7

POTENTIAL SUPERVISOR'S INFORMATION

Name	Shumit Saha
Phone number	(647) 204-8366
Preferred email address	shumit.saha@uhn.ca
Primary U of T department	Institute of Health Policy, Management and Evaluation (IHPME)
Appointment level	- Assistant Professor

Supervisor's primary research interests
Developing artificial intelligence-embedded mobile health technologies, such as wearables, smartphones, and applications (apps), to better manage chronic diseases.

Website	https://ihpme.utoronto.ca/faculty/shumit-saha/

Briefly describe the research that the student(s) will be involved in.
The primary goal of heart failure (HF) management is to maintain stability by predicting and preventing episodes of decompensation. The objective of this project is to investigate the effect of decompensated HF pathophysiology on speech production. The student will be involved in the speech data analysis, including identifying background noises and extracting speech features. Student will perform statistical analysis to investigate the change in the speech features from 24, 48, and 72 hours before the decompensation day. Finally, The student will build end-to-end model machine learning models to predict the episodes of decompensation of HF patients.

Specific skills you're looking for in summer student(s).
1) Python Expertise including sklearn, PyTorch, or Tensorflow
2) Statistical analysis
3) Machine learning expertise

Primary location of research	Centre for Digital Therapeutics, University Health Network
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #8

POTENTIAL SUPERVISOR'S INFORMATION

Name	George Tomlinson
Phone number	(647) 588-4290
Preferred email address	george.tomlinson@utoronto.ca
Primary U of T department	IHPME
Appointment level	- Full Professor

Supervisor's primary research interests
Co-supervision: George Tomlinson (biostatistician), Christopher Yarnell (ICU physician). Critical care medicine, causal inference, machine learning, Bayesian analysis, respiratory failure

Website	https://thebru.ca

Briefly describe the research that the student(s) will be involved in.
Patients with critical illness often receive sedation to facilitate invasive mechanical ventilation. Excess sedation is known to be associated with higher risk of mortality. However, it is unknown whether patient race/ethnicity is associated with the use of sedation. Our project is a retrospective cohort study using available ICU data with two aims: 1) measure the association between patient race/ethnicity and the use of sedation during mechanical ventilation, and 2) estimate the effect on ventilator duration and mortality mediated by any differences in use of sedation. The student will lead this project with close support from the co-supervisory team.

Specific skills you're looking for in summer student(s).
- strong mathematical modeling skills
- knowledge of the following is helpful: Github, SQL / Bigquery, Python, R, Stan
- clinical background or interest
- familiarity with research in the social determinants of health
- experience with literature review
- independent problem-solving ability to overcome programming, logistical, and conceptual challenges

Primary location of research	Remote / Toronto General Hospital, Toronto, Canada
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #9

POTENTIAL SUPERVISOR'S INFORMATION

Name	April Khademi
Phone number	(416) 979-5000
Preferred email address	akhademi@ryerson.ca
Primary U of T department	St. Michael's Hospital
Appointment level	- Associate Professor - TAHSN-affiliated Scientist
Supervisor's primary research interests Machine learning and AI for medical imaging, radiology, pathology.	
Website	https://www.torontomu.ca/akhademi/
Briefly describe the research that the student(s) will be involved in. Development of machine learning systems using Python for medical imaging applications.	
Specific skills you're looking for in summer student(s). Programming (Python) Medical Imaging Neuroimaging Pathology Machine Learning	
Primary location of research	Toronto Metropolitan University, Toronto
Where will the student's research be conducted?	Combination of both
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #10

POTENTIAL SUPERVISOR'S INFORMATION

Name	Alexandre Zlotta
Phone number	(416) 586-3933
Preferred email address	Alexandre.Zlotta@sinaihealth.ca
Primary U of T department	Division of Urology, Department of Surgery
Appointment level	- Full Professor

Supervisor's primary research interests
translational research, artificial intelligence in oncology, prostate cancer, bladder cancer

Website	https://www.lunenfeld.ca/?page=zlotta-alexandre

Briefly describe the research that the student(s) will be involved in.
Our group has previously developed SEPERA – an AI tool to predict the risk of side-specific extraprostatic extension in patients with localized prostate cancer to help guide surgical strategy during radical prostatectomy (https://github.com/JCCKwong/SEPERA). The student will:
1. Assist in validating SEPERA on patients treated at the University Health Network
2. Assess the impact of surgical delays due to the COVID-19 pandemic on the performance of SEPERA
3. Engage with the Prostate Cancer Support Group at the University Health Network to help incorporate patient values and needs into the SEPERA user-interface.

Specific skills you're looking for in summer student(s).
1. Proficiency in Excel, data collection, and basic statistical analysis.
2. Experience in conducting qualitive surveys and understanding of prostate cancer terminology are assets, but not required.
3. Coding experience (Python) is not required. Students will be taught how to run SEPERA to generate predictions with their data.

Primary location of research	Princess Margaret Cancer Centre
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #11

POTENTIAL SUPERVISOR'S INFORMATION

Name	Jose Zariffa
Phone number	(416) 597-3422
Preferred email address	jose.zariffa@utoronto.ca
Primary U of T department	Institute of Biomedical Engineering
Appointment level	- Associate Professor - TAHSN-affiliated Scientist

Supervisor's primary research interests
Rehabilitation engineering; neural engineering; bioelectric signal processing; computer vision; upper limb function.

Website	https://bme.utoronto.ca/faculty-research/core-faculty/jose-zariffa/

Briefly describe the research that the student(s) will be involved in.
The electrical activity of muscles, recorded from the surface of the skin, can be used to control assistive technologies or inform medical care. These surface electromyography (sEMG) signals are commonly represented in a compact form using standard sets of data features, which have changed relatively little in the last 20 years. Deep learning provides an opportunity to create new representations for sEMG data, which may lead to improved performance in multiple applications. This project will use convolutional neural networks to extract general sEMG features, and evaluate their ability to improve performance in existing sEMG classification problems.

Specific skills you're looking for in summer student(s).
Previous experience with deep learning, including customizing neural network architectures, transfer learning, and rigorous performance evaluations.

Primary location of research	KITE Research Institute - Toronto Rehab - University Health Network
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #12

POTENTIAL SUPERVISOR'S INFORMATION

Name	Miranda WITHEFORD
Phone number	(416) 340-3868
Preferred email address	miranda.witheford@uhn.ca
Primary U of T department	Vascular Surgery
Appointment level	- Assistant Professor - TAHSN-affiliated Scientist

Supervisor's primary research interests
aortic aneurysm repair,
intraoperative aortic deformation,
endograft aortic interactions,
graft failure,
machine learning

Briefly describe the research that the student(s) will be involved in.
Aortic aneurysms, dilatations of the aorta, can be repaired surgically using endografts (stent grafts) that line the inside of the aorta. When an endograft is introduced within the vasculature, the aorta and endograft interact and deform; the forces underlying this deformation in the operating room and postoperatively during follow-up are not understood. We also do not understand how long-term forces between the stent graft and aorta contribute to aortic changes and failure of a repair. I use intraoperative software that maps deformation of the aorta to compare preoperative, intraoperative and postoperative deformation and predict aortic graft failure.

Specific skills you're looking for in summer student(s).
- Image (CT) processing
- image segmentation
- machine learning
- basic statistics

Primary location of research	Toronto General Hospital
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #13

POTENTIAL SUPERVISOR'S INFORMATION

Name	Sheena Josselyn
Phone number	(416) 813-7654
Preferred email address	sheena.josselyn@sickkids.ca
Primary U of T department	psychology/physiology
Appointment level	- Full Professor

Supervisor's primary research interests
brain, memory, mice, neuronal representation, calcium imaging, optogenetics

Website	https://jflab.ca

Briefly describe the research that the student(s) will be involved in.
The student will be involved in experiments in which we can literally "watch" neurons fire in the mouse brain while a mouse is learning and remembering an event. The student will help collect and analyze these data to provide a deeper understanding about how the brain encodes, stores and uses information.

Specific skills you're looking for in summer student(s).
wet lab molecular skills or animal handling skills or computational skills (Python) or engineering skills

Primary location of research	SickKids Research Tower (PGCRL)
Where will the student's research be conducted?	In-lab

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #14

POTENTIAL SUPERVISOR'S INFORMATION

Name	Wendy Tsang
Phone number	(416) 340-4397
Preferred email address	wendy.tsang@uhn.ca
Primary U of T department	Medicine/Cardiology
Appointment level	- Assistant Professor

Supervisor's primary research interests
Cardiac Imaging and Artificial Intelligence

Briefly describe the research that the student(s) will be involved in.
Developing artificial intelligence algorithms to further echocardiographic image analysis.

Specific skills you're looking for in summer student(s).
Familiarity with programming languages is a plus.
Must have an knowledge of basic statistics.
Must have an interest in medical imaging.
Must demonstrate strong research and writing skills.

Primary location of research	Toronto General Hospital
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #15

POTENTIAL SUPERVISOR'S INFORMATION

Name	Michael Fralick
Phone number	(647) 403-6187
Preferred email address	mike.fralick@mail.utoronto.ca
Primary U of T department	Department of Medicine
Appointment level	- Assistant Professor

Supervisor's primary research interests
clinical epidemiology, artificial intelligence (AI) in medicine, clinical prediction, machine learning, compassionate care

Website	https://michaelfralicklab.github.io/Home.html

Briefly describe the research that the student(s) will be involved in.
AI diagnostic-prediction tools have the potential to help hospitals and providers at all stages of training realize the proactive ideal of medicine instead of the often reactive reality. Our team is developing an algorithm that can identify life-threatening conditions before they occur in hospitalized patients. However, there can be unintended consequences of implementing AI in medicine. This studentship will focus on [1] exploring the potential for these unintended consequences, and [2] developing educational tools for stakeholders (e.g., physicians, nurses, patients) to enhance understanding of AI in medicine, including its uses, benefits, and limitations as a diagnostic tool.

Specific skills you're looking for in summer student(s).
Strong critical thinking skills;
Qualitative research;
High-level interpersonal, verbal, and written communication skills;
Medical experience an asset;
Knowledge of AI/Machine Learning an asset

Primary location of research	Lunenfeld-Tanenbaum Research Institute, Sinai Health System (Toronto, Ontario)
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #16

POTENTIAL SUPERVISOR'S INFORMATION

Name	Maged Goubran
Phone number	(647) 234-0242
Preferred email address	maged.goubran@utoronto.ca
Primary U of T department	Medical Biophysics
Appointment level	- Assistant Professor

Supervisor's primary research interests
Artificial Intelligence
Computational Neuroscience
Neuroimaging
Connectomics
Neurodegeneration

Website	https://aiconslab.github.io/

Briefly describe the research that the student(s) will be involved in.
The student will be involved in developing and evaluating a novel DL network for accurate axon segmentation of teravoxel-scale/very large 3D brain images, to map changes in brain connectivity in animal models. This is an important task for understanding and developing therapeutic targets for neurodegenerative disease. We have access to a large number of (whole-brain) rodent 3D microscopy datasets (through tissue clearing), and developed existing pipelines for integrated and statistical analyses of cleared volumes with connectomic atlases.

Specific skills you're looking for in summer student(s).
- High Proficiency in Python ideally familiar with libraries such as PyTorch
- Hands-on experience with implementation of different CNN and DL architectures
- Familiarity with bash and Compute Canada

Primary location of research	Sunnybrook Research Institute
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #17

POTENTIAL SUPERVISOR'S INFORMATION

Name	Rajeev Muni
Phone number	(416) 867-7411
Preferred email address	rajeev.muni@gmail.com
Primary U of T department	Ophthalmology
Appointment level	- Assistant Professor

Supervisor's primary research interests
Rhegmatogenous retinal detachment, macular hole, epiretinal membrane, artificial intelligence in ophthalmology, computer vision

Website	https://ophthalmology.utoronto.ca/vice-chair-clinical-research

Briefly describe the research that the student(s) will be involved in.
The student will be involved in our ongoing research to create an algorithm that will serve as a potential biomarker for functional outcomes following retinal surgery. Our current project involves volume quantification of sub-retinal fluid blebs in optical coherence tomography scans to follow-up their resolution longitudinally.

Specific skills you're looking for in summer student(s).
Computer vision and machine learning experience. Ideal programming languages would be mainly Python, but also helpful to have HTML, CSS, Javascript. Programming frameworks would be OpenCV, numpy, sci-kit, and pandas. Experience with retinal or medical imaging would be an added benefit.

Primary location of research	St Michael's Hospital, Toronto, ON
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #18

POTENTIAL SUPERVISOR'S INFORMATION

Name	kathryn Howe
Phone number	(416) 340-5193
Preferred email address	kathryn.howe@uhn.ca
Primary U of T department	Surgery
Appointment level	- Assistant Professor
Supervisor's primary research interests carotid disease and stroke neural networks	
Briefly describe the research that the student(s) will be involved in. working on CNN of imaging	
Specific skills you're looking for in summer student(s). coding previous experience w CNN autonomy written and oral proficiency	
Primary location of research	TGHRI
Where will the student's research be conducted?	Combination of both
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #19

POTENTIAL SUPERVISOR'S INFORMATION

Name	Saman Doroodgar Jorshery
Phone number	(416) 806-2397
Preferred email address	saman.doroodgar@gmail.com
Primary U of T department	Computer Science / Medicine
Appointment level	- TAHSN-affiliated Scientist
Supervisor's primary research interests Vascular Imaging Retinal Imaging	
Website	https://twitter.com/sdorodgar?lang=en
Briefly describe the research that the student(s) will be involved in. Vascular segmentation from retinal fundus images, using Vampire Software.	
Specific skills you're looking for in summer student(s). Knowledge of anatomy Working with annotation softwares	
Primary location of research	University of Toronto
Where will the student's research be conducted?	Remotely
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #20

POTENTIAL SUPERVISOR'S INFORMATION

Name	Mohamed Abdalla
Phone number	(437) 221-2604
Preferred email address	mohamed.abdalla@thp.ca
Primary U of T department	N/A
Appointment level	- TAHSN-affiliated Scientist

Supervisor's primary research interests
Clinical AI, AI Evaluation, AI Deployment, Natural Language Processing, Computer Vision on Imaging, Machine Learning

Website	https://www.cs.toronto.edu/~msa/

Briefly describe the research that the student(s) will be involved in.
Our lab is studying CT-based opportunistic screening: where CT scans are used to assess patient cardiometabolic risk and predict future adverse clinical events (MI, stroke, etc.). For the internship, the dataset will contain patient level biomarkers extracted from CT scans (liver fat, bone density, calcium score, etc.). The student will join the team and performing analyses on the output of the results: a) descriptive analysis features at the population level features and, time permitting, quantitative risk assessments.

Specific skills you're looking for in summer student(s).
The student should have strong fundamental programming skills. ML library knowledge isn't required. Past research experience and/or experience analyzing ML models is preferred. A strong knowledge of anatomy and cardiometabolic diseases would be a highly desired asset. Experience in or interest/willingness to learn radiology/CT anatomy would be recommended.

Primary location of research	Trillium Health Partners, Mississauga
Where will the student's research be conducted?	Remotely

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #21

POTENTIAL SUPERVISOR'S INFORMATION

Name	Kenneth Croitoru
Phone number	(416) 586-4800
Preferred email address	ken.croitoru@sinaihealth.ca
Primary U of T department	Medicine
Appointment level	- Full Professor

Supervisor's primary research interests
Crohn's disease (CD),
Artificial Intelligence,
Large prospective cohort,
Omics and Microbiome,
Machine learning models (Random Forest- Neural Network).

Website	https://croitorulab.com/

Briefly describe the research that the student(s) will be involved in.
Crohn's disease (CD) is predicted to affect 1% of the Canadian population within the next decade. In this context, we are aiming to identify the triggers of CD by following 5000 healthy individuals of whom 100 subjects have now developed CD. Of these participants, 20% show evidence of gut inflammation while remaining healthy after a median follow-up of 6 years. We hypothesize that these individuals may harbor a microbiome community that is protective of CD. The student will explore the existence of a bacterial community with specific metabolic capacity and immunogenic profile associated with a protective effect against CD onset.

Specific skills you're looking for in summer student(s).
Skills we are looking for are:
Machine learning algorithms
Causal mediation analysis
Statistic (R, python)
Conditional logistic regression
Interest in computational biology
Data mining
Ability to work in multidisciplinary team and translational research

Primary location of research	Lunenfeld-Tanenbaum Research Institute (60 Murray Street)
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #22

POTENTIAL SUPERVISOR'S INFORMATION

Name	John Dick
Phone number	(416) 581-7472
Preferred email address	John.Dick@uhnresearch.ca
Primary U of T department	Molecular Genetics
Appointment level	- Full Professor
Supervisor's primary research interests Leukemia, acute myeloid leukemia (AML), cancer stem cells, stem cells, regenerative medicine, hematopoiesis	
Website	http://www.jdstemcellresearch.ca/
Briefly describe the research that the student(s) will be involved in. Students will apply single-cell RNA-seq, ATAC-seq, and machine-learning approaches to investigate age-related clonal hematopoiesis and heterogeneity within the normal hematopoietic stem cell population. Understanding hematopoiesis will enable us to understand how these genetic programs in the normal population generate leukemic stem cells and increase the risk of inflammatory diseases like cardiovascular disease.	
Specific skills you're looking for in summer student(s). Experience in Single Cell RNA-seq and ATAC-seq. Knowledge in machine learning and deep learning. Proficiency with R, Python, Bash, and the HPC cluster. Knowledge in Hematopoiesis and genomics. Strong scientific communication skills.	
Primary location of research	Princess Margaret Cancer Centre, Toronto
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #23

POTENTIAL SUPERVISOR'S INFORMATION

Name	Alex Mariakakis
Phone number	(416) 878-9405
Preferred email address	mariakakis@cs.toronto.edu
Primary U of T department	Computer Science
Appointment level	- Assistant Professor
Supervisor's primary research interests Ubiquitous computing, applied sensing, mobile health	
Website	http://mariakakis.github.io/
Briefly describe the research that the student(s) will be involved in. Spirometry is the most common form of pulmonary function assessment used to diagnose respiratory illnesses. Unfortunately, spirometry data is relatively difficult to obtain, requiring specialized equipment and a difficult maneuver to be performed by patients. Our goal is to develop a system composed of a mobile phone and a 3D-printed accessory to collect reliable spirometry data. The accessory will transduce breathing maneuvers into an audio signal that can be consistently analyzed by the smartphone's microphone. The machine learning component of this project will require developing models capable of estimating standard lung function metrics from this signal.	
Specific skills you're looking for in summer student(s). Required Skills -Experience with data visualization in Python (e.g., Matplotlib, Scipy) -Experience with machine learning and/or deep learning in Python (e.g., Scikit-learn, PyTorch/TensorFlow) Desired Skills -Familiarity with 3D printing -Familiarity with audio signal processing -Familiarity with user study design	
Primary location of research	Bahen Centre (Department of Computer Science)
Where will the student's research be conducted?	Combination of both
T-CAIREM membership Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.	
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #24

POTENTIAL SUPERVISOR'S INFORMATION

Name	Daniel Felsky
Phone number	(416) 939-0423
Preferred email address	daniel.felsky@camh.ca
Primary U of T department	Psychaitry
Appointment level	- Assistant Professor

Supervisor's primary research interests
Biostatistics, population modelling, genomics, multi-'omics, gene-by-environment interaction, aging, neurodegeneration, neurodevelopment, psychosis, depression, dementia, addictions

Website	https://www.felskylab.com

Briefly describe the research that the student(s) will be involved in.
The Whole Person and Population Modelling Lab is a diverse group using integrative biostatistical and machine learning approaches to develop models of mental illness across the lifespan. Data types most often used include genomic (genotype, methylation, RNAseq, proteomic), neuroimaging (fMRI, dMRI, sMRI), peripheral biomarker (cell counts, lipidomic, metabolomic), sociodemographic, behavioural, lifestyle, clinical, and other sources of environmental information (individual, neighbourhood, life experiential). The successful candidate will identify behavioural and biological signatures associated with cognitive performance in substance use disorders using a combination of linear models and clustering approaches in a new clinical cohort study at CAMH.

Specific skills you're looking for in summer student(s).
Aptitude for literature search and independent learning. R and/or Python coding proficiency. Experience with biostatistics, data cleaning, and visualization. Knowledge of psychiatry, public health, human genetics, neuroimaging, or related field is a benefit.

Primary location of research	CAMH / hybrid
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #25

POTENTIAL SUPERVISOR'S INFORMATION

Name	Robert Grant
Phone number	(416) 946-4501
Preferred email address	Robert.Grant@uhn.ca
Primary U of T department	Medicine
Appointment level	- Assistant Professor

Supervisor's primary research interests
Medical Oncology, Biomarkers, Health-Services Research

Briefly describe the research that the student(s) will be involved in.
Students will apply machine learning to improve the care of cancer patients, through matching patients to more effective treatments and proactive management of toxicities. We focus analysis on two main local datasets: 1) high-frequency structured and unstructured EMR data from 70,000 cancer patients; 2) high-dimensional biological data from 500+ pancreatic cancer patients including whole-genome and transcriptome data, as well as drug screening in patient-derived organoids. Topics to explore depending on the interests of students include treatment recommendation systems, toxicity warning system development and deployment, multi-modal data integration, data shift, privacy, and fairness.

Specific skills you're looking for in summer student(s).
Python, Longitudinal Data Analysis, NLP, Critical Thinking

Primary location of research	Princess Margaret Cancer Centre
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #26

POTENTIAL SUPERVISOR'S INFORMATION

Name	Yalini Senathirajah
Phone number	(647) 572-6533
Preferred email address	yalini.senathirajah@utoronto.ca
Primary U of T department	IHPME
Appointment level	- Associate Professor

Supervisor's primary research interests
Incorporation of AI recommendations into care. Predicting disease severity, process mining to understand how disparities occur

Briefly describe the research that the student(s) will be involved in.
Using clinical datastores to predict sleep apnea, liver disease, and other disease risks. Use process mining of clinical and administrative data to understand care processes and points of disparity, as well as causes of diagnostic delay. If interested, students can also work on a novel clinical data interface studying how it may assist in incorporating AI recommendations into care.

Specific skills you're looking for in summer student(s).
Jupyter/python, skills in process mining or willingness to learn, basic ML skills, interest in clinical data and processes. Knowledge of web technologies a plus. Interest in producing publishable papers.

Primary location of research	Remote - can meet in Toronto but will be remote primarily
Where will the student's research be conducted?	Remotely

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #27

POTENTIAL SUPERVISOR'S INFORMATION

Name	Cynthia Hawkins
Phone number	(416) 813-5974
Preferred email address	cynthia.hawkins@sickkids.ca
Primary U of T department	LMP
Appointment level	- Full Professor

Supervisor's primary research interests
pediatric brain tumors
cancer genetics
neuropathology
epigenetics
molecular pathology
neuro-oncology

Website	https://www.hawkins-lab.com/

Briefly describe the research that the student(s) will be involved in.
Machine learning classifiers using data from genome wide methylation arrays have had a major impact on the diagnostic framework for brain tumors over the past decade. In some cases, methylation classifications have identified novel diagnostic entities and prognostically relevant tumor subtypes. However, current methylation classifiers perform relatively poorly on some tumor types, including many pediatric brain tumors and other rare cancer types. Using our extensive dataset of pediatric brain tumors with methylation data, we intend to train new classifiers that will outperform those that are currently available, thereby improving our ability to classify these rare tumors.

Specific skills you're looking for in summer student(s).
- python and/or R programming
- machine learning
- bioinformatics
- genetics and cancer biology
- database management

Primary location of research	SickKids
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #28

POTENTIAL SUPERVISOR'S INFORMATION

Name	Srinivas Raman
Phone number	(416) 946-2320
Preferred email address	srinivas.raman@rmp.uhn.ca
Primary U of T department	Radiation oncology
Appointment level	- Assistant Professor

Supervisor's primary research interests
Radiotherapy, Artificial Intelligence, Prostate cancer, Brachytherapy

Website	https://radonc.utoronto.ca/faculty/srinivas-raman

Briefly describe the research that the student(s) will be involved in.
Low-dose rate (LDR) brachytherapy is an effective and evidence-based treatment for localized prostate cancer. LDR brachytherapy treatment planning typically involves obtaining a pre-procedural ultrasound and iteratively generating a distribution of needles and sources to achieve a desired radiotherapy dose distribution. While some components of the planning process require understanding of patients' disease characteristics and urinary function, many components of the planning process are rule-based and rely purely on the anatomy of the prostate, and relationship to organs-at-risk. To augment and support the current manual planning process, we investigate the role of machine learning to automatically generate LDR brachytherapy plans.

Specific skills you're looking for in summer student(s).
Programming skills in python
Good communications skills, and interest in biomedical research
Basic knowledge of CNNs and RNNs (nice to have)

Primary location of research	Princess Margaret Cancer Center
Where will the student's research be conducted?	Remotely

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #29

POTENTIAL SUPERVISOR'S INFORMATION

Name	Osvaldo Espin-Garcia
Phone number	(519) 661-2111
Preferred email address	osvaldo.espingarcia@utoronto.ca
Primary U of T department	Dalla Lana School of Public Health
Appointment level	- Assistant Professor

Supervisor's primary research interests
two-phase studies, statistical genetics, multi-omics, deep phenotyping, latent variable models

Website	https://www.dlsph.utoronto.ca/faculty-profile/osveg/

Briefly describe the research that the student(s) will be involved in.
In collaboration with an MSc Student in Biostatistics, the student will develop novel neural networks for deep phenotyping of osteoarthritis (OA). The overall goal of this project is to couple convolutional neural networks (CNNs) with sequential architectures (e.g., long-short term memory (LTSM) or gated recurrent unit (GRU)) to improve the characterization of OA progression phenotypes using symptomatic and structural variables. This project will leverage imaging and clinical from the Osteoarthritis Initiative, a cohort study with a 10-year follow up started in 2002 across multiple centers with the objective of pinpointing risk factors and biomarkers for OA.

Specific skills you're looking for in summer student(s).
Familiarity with high performance computing, machine learning, artificial neural networks, UNIX scripting, experience with data processing and/or programming in Python.

Primary location of research	Toronto
Where will the student's research be conducted?	Combination of both

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Are you a T-CAIREM member?	- No, but I will register on the T-CAIREM website

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #30

POTENTIAL SUPERVISOR'S INFORMATION

Name	Rahul Krishnan
Phone number	(647) 482-7590
Preferred email address	rahulgk@cs.toronto.edu
Primary U of T department	Computer Science & LMP
Appointment level	- Assistant Professor

Supervisor's primary research interests
machine learning, machine learning for healthcare, causal inference, deep generative models

Website	http://www.cs.toronto.edu/~rahulgk/index.html

Briefly describe the research that the student(s) will be involved in.
The summer student will develop and apply software tools using machine learning algorithms to solve predictive problems in healthcare.

The projects in the lab that students may be assigned to include:
a) the prediction of outcomes from large scale histopathological image data using tools from deep learning such as vision transformers and convolutional neural networks,
b) identifying patients at highest risk of dying on the transplant waitlist both across the United States and in Toronto,
c) assessing the fairness and trustworthiness of patient risk scores across hospitals in Toronto,
d) studying the transferability of reinforcement learning algorithms across hospitals.

Specific skills you're looking for in summer student(s).
Completion of CSC 311 (Introduction to Machine Learning) or equivalent. Preferred completion of CSC 412 (Probabilistic Inference and Reasoning) or CSC413 (Deep learning). Proficiency and comfort working in pytorch and a desire to work with an interdisciplinary group of scientists and clinicians.

Primary location of research	UofT [Toronto]
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #31

POTENTIAL SUPERVISOR'S INFORMATION

Name	Azadeh Kushki
Phone number	(416) 425-6220
Preferred email address	akushki@hollandbloorview.ca
Primary U of T department	Biomedical Engineering
Appointment level	- Associate Professor

Supervisor's primary research interests
Machine learning for understanding the neurobiology of neurodevelopmental conditions and prediction of health outcomes.

Briefly describe the research that the student(s) will be involved in.
The student will assist with analyses of neuroimaging and behavioural data. This will include data cleaning, outlier detection, data visualization, and running supervised and unsupervised learning pipelines.

Specific skills you're looking for in summer student(s).
Experience with Python and/or R; very basic knowledge of statistics and machine learning (undergraduate course).

Primary location of research	Holland Bloorview Kids Rehabilitation Hospital, Toronto
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #32

POTENTIAL SUPERVISOR'S INFORMATION

Name	Houman Khosravani
Phone number	(647) 444-5201
Preferred email address	houman@stroke.dev
Primary U of T department	Medicine
Appointment level	- Assistant Professor

Supervisor's primary research interests
Improving the quality of care, at the bedside, leveraging machine learning technology, to improve best practices for neurologically injured patients

Website	https://sunnybrook.ca/team/member.asp?t=19&page=24392&m=905

Briefly describe the research that the student(s) will be involved in.
Project MASA (machine learning assisted swallowing assessment) Our aim is to utilize ML, as applied to time-series data, to better characterize swallowing difficulty in the context of stroke. We utilize bedside recording of clinical parameters to help anticipate the swallowing status of the patient, by developing a ML-augmented swallowing assessment that can be done at the bedside. This technology democratizes access so that any clinical provider can assess swallowing of a neurologically injured patient for oral in-take of nutrition and avoid complications of swallowing impairment. REB and preliminary data obtained; embarking on the next phase of validation and implementation.

Specific skills you're looking for in summer student(s).
-great team player and interest in neuroscience
-interest in ML in medicine as applied to quality improvement
-audio segmentation and processing
-coding of supervised ML algorithms for classification of audio signals

Primary location of research	Sunnybrook Health Sciences Centre
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #33

POTENTIAL SUPERVISOR'S INFORMATION

Name	Milad Lankarany
Phone number	(416) 602-4391
Preferred email address	milad.lankarany@uhnresearch.ca
Primary U of T department	milad.lankarany@utoronto.ca
Appointment level	- Assistant Professor

Supervisor's primary research interests
Computational Neuroscience, Biologically-inspired Artificial Intelligence, Closed-Loop Neuromodulation, AI Accelerated Neuro-Technology, Graph Neural Network

Website	https://sites.google.com/view/lnsbsp/home

Briefly describe the research that the student(s) will be involved in.
Epilepsy, the most common serious neurological disorder in the world, affects over 50 million individuals worldwide. Unfortunately, around 50% of medically refractory patients are not resective candidates, which can be attributed in part to poor epileptic zone (EZ) localization (EZ-L). EZ-L is a complex and lengthy procedure, requiring visual inspection and manual processing by human experts. To assist human experts, we aim to develop an AI-driven solution that automates seizure detection and EZ-L. Our solution will be deployed in the Epilepsy Program at the Krembil Brain Institute (KBI) at the Toronto Western Hospital (TWH).

Specific skills you're looking for in summer student(s).
Intermediate to advance knowledge in Math and experience in theoretical Machine Learning, Concepts in Graph Neural networks, Basic knowledge in Physiology, Professional Python Programming, and Good writing skills (for scientific papers)

Primary location of research	Krembil Brain Institute - University Health Network
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #1

POTENTIAL SUPERVISOR'S INFORMATION

Name	Phedias Diamandis
Phone number	(416) 340-4459
Preferred email address	p.diamandis@mail.utoronto.ca
Primary U of T department	Laboratory Medicine and Pathobiology
Appointment level	- Associate Professor

Supervisor's primary research interests
Computational pathology, neuroscience, brain, neurodevelopment, artificial intelligence, machine learning, pathology, computer vision

Website	https://diamandis.org

Briefly describe the research that the student(s) will be involved in.
Students will be involved in working with a team and helping develop and validate computer vision tools to carry out automated analyses of patient tissue in pathology environment.

Examples of possible applications include tumor classification, analysis of intra-tumoral heterogeneity, linking "histomic" markers with outcome and integrating ancillary tests (immunohistochemistry) with conventional H&E-stained images.

Specific skills you're looking for in summer student(s).
The projects are multi-disciplinary and include participants with strong skills in histology, biology, machine learning, and computer science.

Primary location of research	Princess Margaret
Where will the student's research be conducted?	In-lab

T-CAIREM membership
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #2

POTENTIAL SUPERVISOR'S INFORMATION

Name	Sheena Josselyn
Phone number	(416) 813-7654
Preferred email address	sheena.josselyn@sickkids.ca
Primary U of T department	Psychology
Appointment level	- Full Professor
Supervisor's primary research interests memory, mouse, neural computation	
Website	https://jflab.ca/
Briefly describe the research that the student(s) will be involved in. The student would help conduct experiments and analzye data examining the activity of individual neurons as mice learn and remember experiences.	
Specific skills you're looking for in summer student(s). The student should have great math and data analysis skills, a general interest in AI and the brain. experience with Python.	
Primary location of research	Hospital for Sick Children
Where will the student's research be conducted?	In-lab
T-CAIREM membership Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.	
Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #3

POTENTIAL SUPERVISOR'S INFORMATION

Name	Azadeh Yadollahi
Phone number	(416) 275-4315
Preferred email address	Azadeh.Yadollahi@uhn.ca
Primary U of T department	BME
Appointment level	- Associate Professor

Supervisor's primary research interests
Sleep, health equity, wearable devices, respiratory system, cardiac function, artificial intelligence

Website	https://sleepdb.ca

Briefly describe the research that the student(s) will be involved in.
We have a large database of physiological signals during sleep and wakefulness. Our goal is to develop novel machine learning algorithms to
1- Analyze the signals and predict clinical outcomes
2- Predict the risk of respiratory depression in those taking opioids
3- Investigate the type and severity of breathing problems during sleep
4- Estimate the severity of airway narrowing in people with asthma
5- Use this information to develop more accessible technologies to monitor physiological signals at home

Specific skills you're looking for in summer student(s).
Background in machine learning, or
Expertise with Python, or
Background in physiological signal recording, or
Background in digital technologies, or
Background in mobile app development

Primary location of research	University Health Network
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #4

POTENTIAL SUPERVISOR'S INFORMATION

Name	Sushant Kumar
Phone number	(814) 321-5730
Preferred email address	sushant.kumar@uhnresearch.ca
Primary U of T department	sushant.kumar@utoronto.ca
Appointment level	- Assistant Professor
Supervisor's primary research interests cancer genomics, computational biology, machine learning, precision oncology, cancer prevention	
Website	https://ccglab-uhn.github.io
Briefly describe the research that the student(s) will be involved in. We will build machine learning model to predict efficacy of treatment response in cancer patients by integrating genomics, clinical and biomolecular structure data.	
Specific skills you're looking for in summer student(s). programming, statistics, machine learning, cancer, genomics	
Primary location of research	Princess Margaret cancer centre
Where will the student's research be conducted?	Combination of both
T-CAIREM membership Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.	
Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #5

POTENTIAL SUPERVISOR'S INFORMATION

Name	Somi Afiuni
Phone number	(647) 405-2264
Preferred email address	safiuni@lunenfeld.ca
Primary U of T department	Molecular Genetics
Appointment level	- TAHSN-affiliated Scientist

Supervisor's primary research interests
Machine learning, Spatial imaging, Digital pathology, Bioinformatics, Cancer research

Website	https://www.jacksonlabltri.com/

Briefly describe the research that the student(s) will be involved in.
Jackson lab is a systems biology and precision medicine lab located in the Lunenfeld Tanenbaum Research Institute. We investigate the multi-cellular structure and mechanisms of tissues and tumours with imaging using machine learning methods to advance digital pathology applications.
As a Staff data scientist and Computations manager at Jackson lab, we manage multiple projects/regarding data analysis pipelines which the research would be applying different algorithms in the existing data analysis pipeline for spatial imaging in cancer research applications.

Specific skills you're looking for in summer student(s).
Programming languages, Programming frameworks,
Quantitative research, Data analysis, Biology/pathology expertise

Primary location of research	LTRI (Lunenfeld Tanenbaum Research Institute), Mount Siniai Hospital
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #6

POTENTIAL SUPERVISOR'S INFORMATION

Name	Andrew Sage
Phone number	(289) 339-3741
Preferred email address	andrew.sage@uhn.ca
Primary U of T department	Toronto General Hospital Research Institute
Appointment level	- TAHSN-affiliated Scientist

Supervisor's primary research interests
The use of artificial intelligence during ex vivo organ perfusion and transplantation.

Briefly describe the research that the student(s) will be involved in.
- Real-time data acquisition and prediction of transplant patient outcomes
- Digital twin development during ex vivo organ perfusion

Specific skills you're looking for in summer student(s).
- Python, R, or similar programming
- Neural network programming (CNN, RNN, etc.)
- Medical/clinical experience in physiology

Primary location of research	Toronto General Hospital
Where will the student's research be conducted?	Combination of both

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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #7

POTENTIAL SUPERVISOR'S INFORMATION

Name	Shumit Saha
Phone number	(647) 204-8366
Preferred email address	shumit.saha@uhn.ca
Primary U of T department	Institute of Health Policy, Management and Evaluation (IHPME)
Appointment level	- Assistant Professor

Supervisor's primary research interests
Developing artificial intelligence-embedded mobile health technologies, such as wearables, smartphones, and applications (apps), to better manage chronic diseases.

Website	https://ihpme.utoronto.ca/faculty/shumit-saha/

Briefly describe the research that the student(s) will be involved in.
The primary goal of heart failure (HF) management is to maintain stability by predicting and preventing episodes of decompensation. The objective of this project is to investigate the effect of decompensated HF pathophysiology on speech production. The student will be involved in the speech data analysis, including identifying background noises and extracting speech features. Student will perform statistical analysis to investigate the change in the speech features from 24, 48, and 72 hours before the decompensation day. Finally, The student will build end-to-end model machine learning models to predict the episodes of decompensation of HF patients.

Specific skills you're looking for in summer student(s).
1) Python Expertise including sklearn, PyTorch, or Tensorflow
2) Statistical analysis
3) Machine learning expertise

Primary location of research	Centre for Digital Therapeutics, University Health Network
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #8

POTENTIAL SUPERVISOR'S INFORMATION

Name	George Tomlinson
Phone number	(647) 588-4290
Preferred email address	george.tomlinson@utoronto.ca
Primary U of T department	IHPME
Appointment level	- Full Professor

Supervisor's primary research interests
Co-supervision: George Tomlinson (biostatistician), Christopher Yarnell (ICU physician). Critical care medicine, causal inference, machine learning, Bayesian analysis, respiratory failure

Website	https://thebru.ca

Briefly describe the research that the student(s) will be involved in.
Patients with critical illness often receive sedation to facilitate invasive mechanical ventilation. Excess sedation is known to be associated with higher risk of mortality. However, it is unknown whether patient race/ethnicity is associated with the use of sedation. Our project is a retrospective cohort study using available ICU data with two aims: 1) measure the association between patient race/ethnicity and the use of sedation during mechanical ventilation, and 2) estimate the effect on ventilator duration and mortality mediated by any differences in use of sedation. The student will lead this project with close support from the co-supervisory team.

Specific skills you're looking for in summer student(s).
- strong mathematical modeling skills
- knowledge of the following is helpful: Github, SQL / Bigquery, Python, R, Stan
- clinical background or interest
- familiarity with research in the social determinants of health
- experience with literature review
- independent problem-solving ability to overcome programming, logistical, and conceptual challenges

Primary location of research	Remote / Toronto General Hospital, Toronto, Canada
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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Are you a T-CAIREM member?	- No, but I will register on the T-CAIREM website

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #9

POTENTIAL SUPERVISOR'S INFORMATION

Name	April Khademi
Phone number	(416) 979-5000
Preferred email address	akhademi@ryerson.ca
Primary U of T department	St. Michael's Hospital
Appointment level	- Associate Professor - TAHSN-affiliated Scientist
Supervisor's primary research interests Machine learning and AI for medical imaging, radiology, pathology.	
Website	https://www.torontomu.ca/akhademi/
Briefly describe the research that the student(s) will be involved in. Development of machine learning systems using Python for medical imaging applications.	
Specific skills you're looking for in summer student(s). Programming (Python) Medical Imaging Neuroimaging Pathology Machine Learning	
Primary location of research	Toronto Metropolitan University, Toronto
Where will the student's research be conducted?	Combination of both
T-CAIREM membership Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.	
Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #10

POTENTIAL SUPERVISOR'S INFORMATION

Name	Alexandre Zlotta
Phone number	(416) 586-3933
Preferred email address	Alexandre.Zlotta@sinaihealth.ca
Primary U of T department	Division of Urology, Department of Surgery
Appointment level	- Full Professor

Supervisor's primary research interests
translational research, artificial intelligence in oncology, prostate cancer, bladder cancer

Website	https://www.lunenfeld.ca/?page=zlotta-alexandre

Briefly describe the research that the student(s) will be involved in.
Our group has previously developed SEPERA – an AI tool to predict the risk of side-specific extraprostatic extension in patients with localized prostate cancer to help guide surgical strategy during radical prostatectomy (https://github.com/JCCKwong/SEPERA). The student will:
1. Assist in validating SEPERA on patients treated at the University Health Network
2. Assess the impact of surgical delays due to the COVID-19 pandemic on the performance of SEPERA
3. Engage with the Prostate Cancer Support Group at the University Health Network to help incorporate patient values and needs into the SEPERA user-interface.

Specific skills you're looking for in summer student(s).
1. Proficiency in Excel, data collection, and basic statistical analysis.
2. Experience in conducting qualitive surveys and understanding of prostate cancer terminology are assets, but not required.
3. Coding experience (Python) is not required. Students will be taught how to run SEPERA to generate predictions with their data.

Primary location of research	Princess Margaret Cancer Centre
Where will the student's research be conducted?	Combination of both

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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #11

POTENTIAL SUPERVISOR'S INFORMATION

Name	Jose Zariffa
Phone number	(416) 597-3422
Preferred email address	jose.zariffa@utoronto.ca
Primary U of T department	Institute of Biomedical Engineering
Appointment level	- Associate Professor - TAHSN-affiliated Scientist

Supervisor's primary research interests
Rehabilitation engineering; neural engineering; bioelectric signal processing; computer vision; upper limb function.

Website	https://bme.utoronto.ca/faculty-research/core-faculty/jose-zariffa/

Briefly describe the research that the student(s) will be involved in.
The electrical activity of muscles, recorded from the surface of the skin, can be used to control assistive technologies or inform medical care. These surface electromyography (sEMG) signals are commonly represented in a compact form using standard sets of data features, which have changed relatively little in the last 20 years. Deep learning provides an opportunity to create new representations for sEMG data, which may lead to improved performance in multiple applications. This project will use convolutional neural networks to extract general sEMG features, and evaluate their ability to improve performance in existing sEMG classification problems.

Specific skills you're looking for in summer student(s).
Previous experience with deep learning, including customizing neural network architectures, transfer learning, and rigorous performance evaluations.

Primary location of research	KITE Research Institute - Toronto Rehab - University Health Network
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #12

POTENTIAL SUPERVISOR'S INFORMATION

Name	Miranda WITHEFORD
Phone number	(416) 340-3868
Preferred email address	miranda.witheford@uhn.ca
Primary U of T department	Vascular Surgery
Appointment level	- Assistant Professor - TAHSN-affiliated Scientist

Supervisor's primary research interests
aortic aneurysm repair,
intraoperative aortic deformation,
endograft aortic interactions,
graft failure,
machine learning

Briefly describe the research that the student(s) will be involved in.
Aortic aneurysms, dilatations of the aorta, can be repaired surgically using endografts (stent grafts) that line the inside of the aorta. When an endograft is introduced within the vasculature, the aorta and endograft interact and deform; the forces underlying this deformation in the operating room and postoperatively during follow-up are not understood. We also do not understand how long-term forces between the stent graft and aorta contribute to aortic changes and failure of a repair. I use intraoperative software that maps deformation of the aorta to compare preoperative, intraoperative and postoperative deformation and predict aortic graft failure.

Specific skills you're looking for in summer student(s).
- Image (CT) processing
- image segmentation
- machine learning
- basic statistics

Primary location of research	Toronto General Hospital
Where will the student's research be conducted?	Combination of both

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Are you a T-CAIREM member?	- No, but I will register on the T-CAIREM website

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #13

POTENTIAL SUPERVISOR'S INFORMATION

Name	Sheena Josselyn
Phone number	(416) 813-7654
Preferred email address	sheena.josselyn@sickkids.ca
Primary U of T department	psychology/physiology
Appointment level	- Full Professor

Supervisor's primary research interests
brain, memory, mice, neuronal representation, calcium imaging, optogenetics

Website	https://jflab.ca

Briefly describe the research that the student(s) will be involved in.
The student will be involved in experiments in which we can literally "watch" neurons fire in the mouse brain while a mouse is learning and remembering an event. The student will help collect and analyze these data to provide a deeper understanding about how the brain encodes, stores and uses information.

Specific skills you're looking for in summer student(s).
wet lab molecular skills or animal handling skills or computational skills (Python) or engineering skills

Primary location of research	SickKids Research Tower (PGCRL)
Where will the student's research be conducted?	In-lab

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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #14

POTENTIAL SUPERVISOR'S INFORMATION

Name	Wendy Tsang
Phone number	(416) 340-4397
Preferred email address	wendy.tsang@uhn.ca
Primary U of T department	Medicine/Cardiology
Appointment level	- Assistant Professor

Supervisor's primary research interests
Cardiac Imaging and Artificial Intelligence

Briefly describe the research that the student(s) will be involved in.
Developing artificial intelligence algorithms to further echocardiographic image analysis.

Specific skills you're looking for in summer student(s).
Familiarity with programming languages is a plus.
Must have an knowledge of basic statistics.
Must have an interest in medical imaging.
Must demonstrate strong research and writing skills.

Primary location of research	Toronto General Hospital
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #15

POTENTIAL SUPERVISOR'S INFORMATION

Name	Michael Fralick
Phone number	(647) 403-6187
Preferred email address	mike.fralick@mail.utoronto.ca
Primary U of T department	Department of Medicine
Appointment level	- Assistant Professor

Supervisor's primary research interests
clinical epidemiology, artificial intelligence (AI) in medicine, clinical prediction, machine learning, compassionate care

Website	https://michaelfralicklab.github.io/Home.html

Briefly describe the research that the student(s) will be involved in.
AI diagnostic-prediction tools have the potential to help hospitals and providers at all stages of training realize the proactive ideal of medicine instead of the often reactive reality. Our team is developing an algorithm that can identify life-threatening conditions before they occur in hospitalized patients. However, there can be unintended consequences of implementing AI in medicine. This studentship will focus on [1] exploring the potential for these unintended consequences, and [2] developing educational tools for stakeholders (e.g., physicians, nurses, patients) to enhance understanding of AI in medicine, including its uses, benefits, and limitations as a diagnostic tool.

Specific skills you're looking for in summer student(s).
Strong critical thinking skills;
Qualitative research;
High-level interpersonal, verbal, and written communication skills;
Medical experience an asset;
Knowledge of AI/Machine Learning an asset

Primary location of research	Lunenfeld-Tanenbaum Research Institute, Sinai Health System (Toronto, Ontario)
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #16

POTENTIAL SUPERVISOR'S INFORMATION

Name	Maged Goubran
Phone number	(647) 234-0242
Preferred email address	maged.goubran@utoronto.ca
Primary U of T department	Medical Biophysics
Appointment level	- Assistant Professor

Supervisor's primary research interests
Artificial Intelligence
Computational Neuroscience
Neuroimaging
Connectomics
Neurodegeneration

Website	https://aiconslab.github.io/

Briefly describe the research that the student(s) will be involved in.
The student will be involved in developing and evaluating a novel DL network for accurate axon segmentation of teravoxel-scale/very large 3D brain images, to map changes in brain connectivity in animal models. This is an important task for understanding and developing therapeutic targets for neurodegenerative disease. We have access to a large number of (whole-brain) rodent 3D microscopy datasets (through tissue clearing), and developed existing pipelines for integrated and statistical analyses of cleared volumes with connectomic atlases.

Specific skills you're looking for in summer student(s).
- High Proficiency in Python ideally familiar with libraries such as PyTorch
- Hands-on experience with implementation of different CNN and DL architectures
- Familiarity with bash and Compute Canada

Primary location of research	Sunnybrook Research Institute
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #17

POTENTIAL SUPERVISOR'S INFORMATION

Name	Rajeev Muni
Phone number	(416) 867-7411
Preferred email address	rajeev.muni@gmail.com
Primary U of T department	Ophthalmology
Appointment level	- Assistant Professor

Supervisor's primary research interests
Rhegmatogenous retinal detachment, macular hole, epiretinal membrane, artificial intelligence in ophthalmology, computer vision

Website	https://ophthalmology.utoronto.ca/vice-chair-clinical-research

Briefly describe the research that the student(s) will be involved in.
The student will be involved in our ongoing research to create an algorithm that will serve as a potential biomarker for functional outcomes following retinal surgery. Our current project involves volume quantification of sub-retinal fluid blebs in optical coherence tomography scans to follow-up their resolution longitudinally.

Specific skills you're looking for in summer student(s).
Computer vision and machine learning experience. Ideal programming languages would be mainly Python, but also helpful to have HTML, CSS, Javascript. Programming frameworks would be OpenCV, numpy, sci-kit, and pandas. Experience with retinal or medical imaging would be an added benefit.

Primary location of research	St Michael's Hospital, Toronto, ON
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #18

POTENTIAL SUPERVISOR'S INFORMATION

Name	kathryn Howe
Phone number	(416) 340-5193
Preferred email address	kathryn.howe@uhn.ca
Primary U of T department	Surgery
Appointment level	- Assistant Professor
Supervisor's primary research interests carotid disease and stroke neural networks	
Briefly describe the research that the student(s) will be involved in. working on CNN of imaging	
Specific skills you're looking for in summer student(s). coding previous experience w CNN autonomy written and oral proficiency	
Primary location of research	TGHRI
Where will the student's research be conducted?	Combination of both
T-CAIREM membership Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.	
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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #19

POTENTIAL SUPERVISOR'S INFORMATION

Name	Saman Doroodgar Jorshery
Phone number	(416) 806-2397
Preferred email address	saman.doroodgar@gmail.com
Primary U of T department	Computer Science / Medicine
Appointment level	- TAHSN-affiliated Scientist
Supervisor's primary research interests Vascular Imaging Retinal Imaging	
Website	https://twitter.com/sdorodgar?lang=en
Briefly describe the research that the student(s) will be involved in. Vascular segmentation from retinal fundus images, using Vampire Software.	
Specific skills you're looking for in summer student(s). Knowledge of anatomy Working with annotation softwares	
Primary location of research	University of Toronto
Where will the student's research be conducted?	Remotely
T-CAIREM membership Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.	
Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #20

POTENTIAL SUPERVISOR'S INFORMATION

Name	Mohamed Abdalla
Phone number	(437) 221-2604
Preferred email address	mohamed.abdalla@thp.ca
Primary U of T department	N/A
Appointment level	- TAHSN-affiliated Scientist

Supervisor's primary research interests
Clinical AI, AI Evaluation, AI Deployment, Natural Language Processing, Computer Vision on Imaging, Machine Learning

Website	https://www.cs.toronto.edu/~msa/

Briefly describe the research that the student(s) will be involved in.
Our lab is studying CT-based opportunistic screening: where CT scans are used to assess patient cardiometabolic risk and predict future adverse clinical events (MI, stroke, etc.). For the internship, the dataset will contain patient level biomarkers extracted from CT scans (liver fat, bone density, calcium score, etc.). The student will join the team and performing analyses on the output of the results: a) descriptive analysis features at the population level features and, time permitting, quantitative risk assessments.

Specific skills you're looking for in summer student(s).
The student should have strong fundamental programming skills. ML library knowledge isn't required. Past research experience and/or experience analyzing ML models is preferred. A strong knowledge of anatomy and cardiometabolic diseases would be a highly desired asset. Experience in or interest/willingness to learn radiology/CT anatomy would be recommended.

Primary location of research	Trillium Health Partners, Mississauga
Where will the student's research be conducted?	Remotely

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #21

POTENTIAL SUPERVISOR'S INFORMATION

Name	Kenneth Croitoru
Phone number	(416) 586-4800
Preferred email address	ken.croitoru@sinaihealth.ca
Primary U of T department	Medicine
Appointment level	- Full Professor

Supervisor's primary research interests
Crohn's disease (CD),
Artificial Intelligence,
Large prospective cohort,
Omics and Microbiome,
Machine learning models (Random Forest- Neural Network).

Website	https://croitorulab.com/

Briefly describe the research that the student(s) will be involved in.
Crohn's disease (CD) is predicted to affect 1% of the Canadian population within the next decade. In this context, we are aiming to identify the triggers of CD by following 5000 healthy individuals of whom 100 subjects have now developed CD. Of these participants, 20% show evidence of gut inflammation while remaining healthy after a median follow-up of 6 years. We hypothesize that these individuals may harbor a microbiome community that is protective of CD. The student will explore the existence of a bacterial community with specific metabolic capacity and immunogenic profile associated with a protective effect against CD onset.

Specific skills you're looking for in summer student(s).
Skills we are looking for are:
Machine learning algorithms
Causal mediation analysis
Statistic (R, python)
Conditional logistic regression
Interest in computational biology
Data mining
Ability to work in multidisciplinary team and translational research

Primary location of research	Lunenfeld-Tanenbaum Research Institute (60 Murray Street)
Where will the student's research be conducted?	Combination of both

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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #22

POTENTIAL SUPERVISOR'S INFORMATION

Name	John Dick
Phone number	(416) 581-7472
Preferred email address	John.Dick@uhnresearch.ca
Primary U of T department	Molecular Genetics
Appointment level	- Full Professor
Supervisor's primary research interests Leukemia, acute myeloid leukemia (AML), cancer stem cells, stem cells, regenerative medicine, hematopoiesis	
Website	http://www.jdstemcellresearch.ca/
Briefly describe the research that the student(s) will be involved in. Students will apply single-cell RNA-seq, ATAC-seq, and machine-learning approaches to investigate age-related clonal hematopoiesis and heterogeneity within the normal hematopoietic stem cell population. Understanding hematopoiesis will enable us to understand how these genetic programs in the normal population generate leukemic stem cells and increase the risk of inflammatory diseases like cardiovascular disease.	
Specific skills you're looking for in summer student(s). Experience in Single Cell RNA-seq and ATAC-seq. Knowledge in machine learning and deep learning. Proficiency with R, Python, Bash, and the HPC cluster. Knowledge in Hematopoiesis and genomics. Strong scientific communication skills.	
Primary location of research	Princess Margaret Cancer Centre, Toronto
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #23

POTENTIAL SUPERVISOR'S INFORMATION

Name	Alex Mariakakis
Phone number	(416) 878-9405
Preferred email address	mariakakis@cs.toronto.edu
Primary U of T department	Computer Science
Appointment level	- Assistant Professor
Supervisor's primary research interests Ubiquitous computing, applied sensing, mobile health	
Website	http://mariakakis.github.io/
Briefly describe the research that the student(s) will be involved in. Spirometry is the most common form of pulmonary function assessment used to diagnose respiratory illnesses. Unfortunately, spirometry data is relatively difficult to obtain, requiring specialized equipment and a difficult maneuver to be performed by patients. Our goal is to develop a system composed of a mobile phone and a 3D-printed accessory to collect reliable spirometry data. The accessory will transduce breathing maneuvers into an audio signal that can be consistently analyzed by the smartphone's microphone. The machine learning component of this project will require developing models capable of estimating standard lung function metrics from this signal.	
Specific skills you're looking for in summer student(s). Required Skills -Experience with data visualization in Python (e.g., Matplotlib, Scipy) -Experience with machine learning and/or deep learning in Python (e.g., Scikit-learn, PyTorch/TensorFlow) Desired Skills -Familiarity with 3D printing -Familiarity with audio signal processing -Familiarity with user study design	
Primary location of research	Bahen Centre (Department of Computer Science)
Where will the student's research be conducted?	Combination of both
T-CAIREM membership Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.	
Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #24

POTENTIAL SUPERVISOR'S INFORMATION

Name	Daniel Felsky
Phone number	(416) 939-0423
Preferred email address	daniel.felsky@camh.ca
Primary U of T department	Psychaitry
Appointment level	- Assistant Professor

Supervisor's primary research interests
Biostatistics, population modelling, genomics, multi-'omics, gene-by-environment interaction, aging, neurodegeneration, neurodevelopment, psychosis, depression, dementia, addictions

Website	https://www.felskylab.com

Briefly describe the research that the student(s) will be involved in.
The Whole Person and Population Modelling Lab is a diverse group using integrative biostatistical and machine learning approaches to develop models of mental illness across the lifespan. Data types most often used include genomic (genotype, methylation, RNAseq, proteomic), neuroimaging (fMRI, dMRI, sMRI), peripheral biomarker (cell counts, lipidomic, metabolomic), sociodemographic, behavioural, lifestyle, clinical, and other sources of environmental information (individual, neighbourhood, life experiential). The successful candidate will identify behavioural and biological signatures associated with cognitive performance in substance use disorders using a combination of linear models and clustering approaches in a new clinical cohort study at CAMH.

Specific skills you're looking for in summer student(s).
Aptitude for literature search and independent learning. R and/or Python coding proficiency. Experience with biostatistics, data cleaning, and visualization. Knowledge of psychiatry, public health, human genetics, neuroimaging, or related field is a benefit.

Primary location of research	CAMH / hybrid
Where will the student's research be conducted?	Combination of both

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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #25

POTENTIAL SUPERVISOR'S INFORMATION

Name	Robert Grant
Phone number	(416) 946-4501
Preferred email address	Robert.Grant@uhn.ca
Primary U of T department	Medicine
Appointment level	- Assistant Professor

Supervisor's primary research interests
Medical Oncology, Biomarkers, Health-Services Research

Briefly describe the research that the student(s) will be involved in.
Students will apply machine learning to improve the care of cancer patients, through matching patients to more effective treatments and proactive management of toxicities. We focus analysis on two main local datasets: 1) high-frequency structured and unstructured EMR data from 70,000 cancer patients; 2) high-dimensional biological data from 500+ pancreatic cancer patients including whole-genome and transcriptome data, as well as drug screening in patient-derived organoids. Topics to explore depending on the interests of students include treatment recommendation systems, toxicity warning system development and deployment, multi-modal data integration, data shift, privacy, and fairness.

Specific skills you're looking for in summer student(s).
Python, Longitudinal Data Analysis, NLP, Critical Thinking

Primary location of research	Princess Margaret Cancer Centre
Where will the student's research be conducted?	Combination of both

T-CAIREM membership
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Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #26

POTENTIAL SUPERVISOR'S INFORMATION

Name	Yalini Senathirajah
Phone number	(647) 572-6533
Preferred email address	yalini.senathirajah@utoronto.ca
Primary U of T department	IHPME
Appointment level	- Associate Professor

Supervisor's primary research interests
Incorporation of AI recommendations into care. Predicting disease severity, process mining to understand how disparities occur

Briefly describe the research that the student(s) will be involved in.
Using clinical datastores to predict sleep apnea, liver disease, and other disease risks. Use process mining of clinical and administrative data to understand care processes and points of disparity, as well as causes of diagnostic delay. If interested, students can also work on a novel clinical data interface studying how it may assist in incorporating AI recommendations into care.

Specific skills you're looking for in summer student(s).
Jupyter/python, skills in process mining or willingness to learn, basic ML skills, interest in clinical data and processes. Knowledge of web technologies a plus. Interest in producing publishable papers.

Primary location of research	Remote - can meet in Toronto but will be remote primarily
Where will the student's research be conducted?	Remotely

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Faculty who are new to the field of health AI research and are not members of T-CAIREM, please see the Membership section of our web site for details on becoming a member. Membership is free.

Are you a T-CAIREM member?	- Yes, I'm a T-CAIREM member

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #27

POTENTIAL SUPERVISOR'S INFORMATION

Name	Cynthia Hawkins
Phone number	(416) 813-5974
Preferred email address	cynthia.hawkins@sickkids.ca
Primary U of T department	LMP
Appointment level	- Full Professor

Supervisor's primary research interests
pediatric brain tumors
cancer genetics
neuropathology
epigenetics
molecular pathology
neuro-oncology

Website	https://www.hawkins-lab.com/

Briefly describe the research that the student(s) will be involved in.
Machine learning classifiers using data from genome wide methylation arrays have had a major impact on the diagnostic framework for brain tumors over the past decade. In some cases, methylation classifications have identified novel diagnostic entities and prognostically relevant tumor subtypes. However, current methylation classifiers perform relatively poorly on some tumor types, including many pediatric brain tumors and other rare cancer types. Using our extensive dataset of pediatric brain tumors with methylation data, we intend to train new classifiers that will outperform those that are currently available, thereby improving our ability to classify these rare tumors.

Specific skills you're looking for in summer student(s).
- python and/or R programming
- machine learning
- bioinformatics
- genetics and cancer biology
- database management

Primary location of research	SickKids
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #28

POTENTIAL SUPERVISOR'S INFORMATION

Name	Srinivas Raman
Phone number	(416) 946-2320
Preferred email address	srinivas.raman@rmp.uhn.ca
Primary U of T department	Radiation oncology
Appointment level	- Assistant Professor

Supervisor's primary research interests
Radiotherapy, Artificial Intelligence, Prostate cancer, Brachytherapy

Website	https://radonc.utoronto.ca/faculty/srinivas-raman

Briefly describe the research that the student(s) will be involved in.
Low-dose rate (LDR) brachytherapy is an effective and evidence-based treatment for localized prostate cancer. LDR brachytherapy treatment planning typically involves obtaining a pre-procedural ultrasound and iteratively generating a distribution of needles and sources to achieve a desired radiotherapy dose distribution. While some components of the planning process require understanding of patients' disease characteristics and urinary function, many components of the planning process are rule-based and rely purely on the anatomy of the prostate, and relationship to organs-at-risk. To augment and support the current manual planning process, we investigate the role of machine learning to automatically generate LDR brachytherapy plans.

Specific skills you're looking for in summer student(s).
Programming skills in python
Good communications skills, and interest in biomedical research
Basic knowledge of CNNs and RNNs (nice to have)

Primary location of research	Princess Margaret Cancer Center
Where will the student's research be conducted?	Remotely

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #29

POTENTIAL SUPERVISOR'S INFORMATION

Name	Osvaldo Espin-Garcia
Phone number	(519) 661-2111
Preferred email address	osvaldo.espingarcia@utoronto.ca
Primary U of T department	Dalla Lana School of Public Health
Appointment level	- Assistant Professor

Supervisor's primary research interests
two-phase studies, statistical genetics, multi-omics, deep phenotyping, latent variable models

Website	https://www.dlsph.utoronto.ca/faculty-profile/osveg/

Briefly describe the research that the student(s) will be involved in.
In collaboration with an MSc Student in Biostatistics, the student will develop novel neural networks for deep phenotyping of osteoarthritis (OA). The overall goal of this project is to couple convolutional neural networks (CNNs) with sequential architectures (e.g., long-short term memory (LTSM) or gated recurrent unit (GRU)) to improve the characterization of OA progression phenotypes using symptomatic and structural variables. This project will leverage imaging and clinical from the Osteoarthritis Initiative, a cohort study with a 10-year follow up started in 2002 across multiple centers with the objective of pinpointing risk factors and biomarkers for OA.

Specific skills you're looking for in summer student(s).
Familiarity with high performance computing, machine learning, artificial neural networks, UNIX scripting, experience with data processing and/or programming in Python.

Primary location of research	Toronto
Where will the student's research be conducted?	Combination of both

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Are you a T-CAIREM member?	- No, but I will register on the T-CAIREM website

T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #30

POTENTIAL SUPERVISOR'S INFORMATION

Name	Rahul Krishnan
Phone number	(647) 482-7590
Preferred email address	rahulgk@cs.toronto.edu
Primary U of T department	Computer Science & LMP
Appointment level	- Assistant Professor

Supervisor's primary research interests
machine learning, machine learning for healthcare, causal inference, deep generative models

Website	http://www.cs.toronto.edu/~rahulgk/index.html

Briefly describe the research that the student(s) will be involved in.
The summer student will develop and apply software tools using machine learning algorithms to solve predictive problems in healthcare.

The projects in the lab that students may be assigned to include:
a) the prediction of outcomes from large scale histopathological image data using tools from deep learning such as vision transformers and convolutional neural networks,
b) identifying patients at highest risk of dying on the transplant waitlist both across the United States and in Toronto,
c) assessing the fairness and trustworthiness of patient risk scores across hospitals in Toronto,
d) studying the transferability of reinforcement learning algorithms across hospitals.

Specific skills you're looking for in summer student(s).
Completion of CSC 311 (Introduction to Machine Learning) or equivalent. Preferred completion of CSC 412 (Probabilistic Inference and Reasoning) or CSC413 (Deep learning). Proficiency and comfort working in pytorch and a desire to work with an interdisciplinary group of scientists and clinicians.

Primary location of research	UofT [Toronto]
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #31

POTENTIAL SUPERVISOR'S INFORMATION

Name	Azadeh Kushki
Phone number	(416) 425-6220
Preferred email address	akushki@hollandbloorview.ca
Primary U of T department	Biomedical Engineering
Appointment level	- Associate Professor

Supervisor's primary research interests
Machine learning for understanding the neurobiology of neurodevelopmental conditions and prediction of health outcomes.

Briefly describe the research that the student(s) will be involved in.
The student will assist with analyses of neuroimaging and behavioural data. This will include data cleaning, outlier detection, data visualization, and running supervised and unsupervised learning pipelines.

Specific skills you're looking for in summer student(s).
Experience with Python and/or R; very basic knowledge of statistics and machine learning (undergraduate course).

Primary location of research	Holland Bloorview Kids Rehabilitation Hospital, Toronto
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #32

POTENTIAL SUPERVISOR'S INFORMATION

Name	Houman Khosravani
Phone number	(647) 444-5201
Preferred email address	houman@stroke.dev
Primary U of T department	Medicine
Appointment level	- Assistant Professor

Supervisor's primary research interests
Improving the quality of care, at the bedside, leveraging machine learning technology, to improve best practices for neurologically injured patients

Website	https://sunnybrook.ca/team/member.asp?t=19&page=24392&m=905

Briefly describe the research that the student(s) will be involved in.
Project MASA (machine learning assisted swallowing assessment) Our aim is to utilize ML, as applied to time-series data, to better characterize swallowing difficulty in the context of stroke. We utilize bedside recording of clinical parameters to help anticipate the swallowing status of the patient, by developing a ML-augmented swallowing assessment that can be done at the bedside. This technology democratizes access so that any clinical provider can assess swallowing of a neurologically injured patient for oral in-take of nutrition and avoid complications of swallowing impairment. REB and preliminary data obtained; embarking on the next phase of validation and implementation.

Specific skills you're looking for in summer student(s).
-great team player and interest in neuroscience
-interest in ML in medicine as applied to quality improvement
-audio segmentation and processing
-coding of supervised ML algorithms for classification of audio signals

Primary location of research	Sunnybrook Health Sciences Centre
Where will the student's research be conducted?	Combination of both

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T-CAIREM • 2023 Call for Faculty Supervisors for Summer Research Studentships #33

POTENTIAL SUPERVISOR'S INFORMATION

Name	Milad Lankarany
Phone number	(416) 602-4391
Preferred email address	milad.lankarany@uhnresearch.ca
Primary U of T department	milad.lankarany@utoronto.ca
Appointment level	- Assistant Professor

Supervisor's primary research interests
Computational Neuroscience, Biologically-inspired Artificial Intelligence, Closed-Loop Neuromodulation, AI Accelerated Neuro-Technology, Graph Neural Network

Website	https://sites.google.com/view/lnsbsp/home

Briefly describe the research that the student(s) will be involved in.
Epilepsy, the most common serious neurological disorder in the world, affects over 50 million individuals worldwide. Unfortunately, around 50% of medically refractory patients are not resective candidates, which can be attributed in part to poor epileptic zone (EZ) localization (EZ-L). EZ-L is a complex and lengthy procedure, requiring visual inspection and manual processing by human experts. To assist human experts, we aim to develop an AI-driven solution that automates seizure detection and EZ-L. Our solution will be deployed in the Epilepsy Program at the Krembil Brain Institute (KBI) at the Toronto Western Hospital (TWH).

Specific skills you're looking for in summer student(s).
Intermediate to advance knowledge in Math and experience in theoretical Machine Learning, Concepts in Graph Neural networks, Basic knowledge in Physiology, Professional Python Programming, and Good writing skills (for scientific papers)

Primary location of research	Krembil Brain Institute - University Health Network
Where will the student's research be conducted?	Combination of both

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