Letter of Intent

January 31, 2025

Dear Lung Ambition Awards Adjudication Committee Members,

RE: ***The Lung Clinical Trials Network Study: Examining the impact of a Lung Cancer Clinical Trials Navigator (LC-CTN) on Patient Reported Outcomes and Participation in Clinical Trials.***

Please accept this research proposal, which focuses on two key areas of need:

(1) This research project focuses on ways in which institutions and systems can improve the timeliness and coordination of patient care along the lung cancer patient pathway, by focusing on improved efficiency of access to lung cancer clinical trials.
(2) This proposal also focuses on ways to address disparities in access to clinical trials, particularly in rural regions and community oncology centres.

At the recent December 5, 2024 Lung Cancer Canada Policy Forum, entitled, "Clinical Trials: Towards a Patient-Centric Model", Dr. Rosalyn Juergens, Dr. Lacey Pitre, Stephen Sunquist, and I all spoke about improving access to clinical trials and reducing barriers to access. We spoke about the importance of providing trials access to patients to improve quality and quantity of life in lung cancer patients. Specifically, Dr. Pitre described the positive impact of introducing clinical trial options to Timmins and Sault Ste. Marie patients through her program, Canadian Remote Access Framework for Clinical Trials (CRAFT). Stephen Sunquist spoke about 3CTN (Canadian Cancer Clinical Trials Network) as a means of collating all clinical trials options for patients to access.

That sparked significant interest, as less then 6 months prior, my CARMA-BROS (**CAnadian CAncers with Rare Molecular Alterations - Basket Real-world Observational Study)** network started partnering with 3CTN and the Cancer Clinical Trials Navigator program expansion project. Dr. Caroline Hamm, a medical oncologist in Windsor, had initiated the navigator program locally with demonstrated success. She and Dr. Megan Delisle, an academic surgical oncologist in Winnipeg, are co-leading a funded effort to expand the use of clinical trials navigators to other centres that had challenges recruiting patients to trials. Drs. Delisle and Hamm had developed a research project that was supported by CIHR, 3CTN and Breast Cancer Canada, to expand the pilot use of clinical trial navigators from Windsor to Winnipeg and Thunder Bay. CARMA-BROS partnered with this Clinical Trials Navigator research project, because CARMA-BROS had the infrastructure to support the sharing of patient data across centres, thus facilitating the matching of patient information with clinical trial options. However, the funding was only for clinical trial navigation of metastatic breast cancer patients, as a proof of principle of the benefits of such a cancer clinical trial program across Canada. Although CARMA-BROS is expanding into other disease sites (e.g. GI disease sites, mucosal melanoma, peritoneal metastases, and now breast cancer), this network has always been anchored by lung cancer and lung cancer medical oncologists. So, there was always a plan to look for opportunities to expand this Clinical Trials Navigation program to serve lung cancer patients (i.e LC-CTN) and build lung cancer networking and infrastructure nationally.

A "Eureka" moment occurred at the LCC Policy Forum. I saw an opportunity to expand the breast cancer navigator program into lung cancer. Further, by bringing in CARMA-BROS, we could theoretically eventually expand to many other centres across Canada (CARMA-BROS has 19 active sites from Vancouver through to Halifax, with 8 more in the middle of onboarding). The research thus brings together multiple disparate networks (3CTN, CARMA-BROS) together with an innovative approach (use of a clinical trials navigator) to achieve a critically impactful goal of increasing patient satisfaction, knowledge, and access to clinical trials.

A lot of the research infrastructure to investigate the utility of a clinical trials navigator in a metastatic breast cancer setting has already been funded separately, including the main study design, which encompasses three aims of measuring effectiveness, implementation, and automation. This current proposal simply adds on a lung cancer cohort to an already-well developed research project, maximizing infrastructure and financial efficiency. It is also highly likely to be feasible, given that the breast cancer project is well underway. $50,000 is not a lot of funds for an ambitious infrastructure-generating proof-of-principle research project, but is adequate when applied as an expansion of a current research project already funded by multiple other sources.

This proposal has not been sent to other agencies for funding. However, this research proposal leverages existing infrastructure support secured through funding from 3CTN, CIHR, and Breast Cancer Canada. CARMA-BROS also has infrastructure funding through Takeda, AstraZeneca, Pfizer and Amgen.

The host institution for this project will be Princess Margaret Cancer Centre, as the lead site for CARMA-BROS. Funds will be distributed to Windsor, Winnipeg, and Thunder Bay.

Sincerely,

Geoffrey Liu, MD FRCPC
M. Qasim Choksi Chair in Lung Cancer Translational Research, Princess Margaret Cancer Centre
Director of FLIGHT (Fostering Lung cancer Innovation in Global Health Translation)
Professor of Medicine, Medical Biophysics, Pharmacology and Toxicology, Institute of Medical Science, Epidemiology, Dalla Lana School of Public Health, University of Toronto.

Summary of the proposed research (Max 2 pages): Lung Cancer CTN Study: Examining the impact of a Lung Cancer Clinical Trials Navigator (LC-CTN) on Patient Reported Outcomes and Participation in Clinical Trials.

Background: Access to clinical trials is not equitably distributed in Canada, with significant geographic disparities. For example, trial availability in Ontario ranges from one trial to 350 trials per cancer center. The rate of trial enrollment is lowest in rural populations and at community hospitals, which account for 65% of hospitals in Canada. The lack of availability of clinical trials in the community setting is cited as the main barrier to trial enrollment in 30-60% of people living with cancer. If no trial is available at the home institution, there is limited time for healthcare professionals to effectively search for and refer patients to available trials [PMID: 38660007]. The Windsor Clinical Trials Navigator Program (PI C. Hamm) is a navigator-assisted clinical trial program that utilizes sophisticated surveys and dynamic, accurate clinical trial search tools (termed the Master Lists) and has previously demonstrated that a navigator can increase clinical trial referral and enrollment at Windsor, increasing enrolment rates from 1% to 8% [PMID: 39590157; PMID: 36165718]. CIHR, 3CTN (Canadian Cancer Clinical Trials Network; Director S. Sunquist) and Breast Cancer Canada have funded the expansion of this navigator program to Thunder Bay and Winnipeg, as both of these sites have identified a lack of trial availability as a significant challenge for their patients; however, this expansion is limited to metastatic breast cancer trials/patients. This metastatic breast cancer expansion includes funding for information technology partners to automate processes to build these Master Lists in real time as trials are added. Recently, this collaboration has partnered with CARMA-BROS, an observational study (PI: G. Liu) to facilitate implementation across multiple sites. The current research proposal has plan to expand this navigator approach to improve matching of ***lung cancer*** patients to appropriate trials.

Objectives: To expand the existing clinical trials navigator program to include navigation in lung cancer. The co-primary aims focus on the **effectiveness** of this program and its **implementation** respectively. In addition, we will examine our success in **automating** the maintenance of the Master Lists. Effectiveness is defined as an increase in patient referral to, and enrolment into clinical trials, as well as improvement in patient experience (e.g. sense of control), using patient reported outcomes (PROs), when patients are supported by the navigator program. The impact of the navigator program implementation strategies will be evaluated, with identification of barriers and facilitators for wider scale uptake. Automation success is defined as maintenance of a real-time Master List of clinical trials for patient matching using five different websites.

Methods: A prospective pilot, multi-center, stepped wedge, cluster randomized controlled trial (SW-RCT) is already funded by Breast Cancer Canada and 3CTN, to assess the effectiveness of navigator-assisted clinical trial searches on referrals to, and enrolment in breast cancer clinical trials at 3 cancer centres. The goal of the already funded SW-RCT is to expand to centres across Canada. Lung Ambition funding will allow additional expansion of this trial to include lung cancer patients. We will use a Hybrid Effectiveness-Implementation Type 1 trial design to improve our understanding of the effectiveness of the clinical trials navigator program on the search and referral process for lung cancer clinical trials and implementation of the LC-CTN Program in diverse cancer centers. Type 1 trial designs explore implementability of an intervention while testing its effectiveness. We will use both quantitative and qualitative descriptive methods. Supported by the Consolidated Framework for Implementation Research (CFIR) and RE-AIM frameworks, the implementation process for LC-CTN has five components: a) initial organizational engagement; b) piloting the LC-CTN program in selected centres; c) three-center SW-RCT; d) evaluation of the implementation process and outcomes; e) analysis of PRO measurements pre- and post- interventions. The primary comparison time of interest will be the post-implementation period versus the standard of care (pre-implementation) period. A unique automated trial matching workflow that integrates the Master List platform, collaboration with artificial intelligence, and an automated trial matching service is already being developed from existing funding for metastatic breast cancer trials. Lung Ambition funding will expand these processes to include lung cancer patients/trials.

Inclusion/Exclusion Criteria: For the 3 sites where clinical trial navigators are already present (Windsor, Thunder Bay, Winnipeg), lung cancer patients will be included (in addition to previously funded metastatic breast cancer patients who are on chemotherapy). We plan to recruit 10 lung cancer patients per site for interviews, as over 30 breast cancer patients have already been recruited per site; the focus of these lung cancer patient interviews

will be on potential differences in patient attitudes and experience between the two disease sites, to aid in calibrating the program to lung cancer.

Interventions: The design is a prospective multi-centre, stepped wedge, cluster randomized controlled trial with the objective of assessing the impact of navigator-assisted clinical trials searches on referrals to and enrolment in clinical trials. Each participating centre will enter the trial using current standard of care for clinical trial searches. Patient referral and enrolment numbers will be collected from patient charts monthly. After 2 months, the navigator program will be promoted at each centre. To avoid contamination, a washout period of 1 month will be allowed after the LC-CTN program is first introduced to each centre. Randomization refers to the sequence of timing of crossover from control to intervention for each of the 3 centres, with staggered crossover at the 3, 6, and 9 month marks (see budget timeline for additional details). As breast cancer implementation will have occurred first, this proposal's lung cancer implementation will benefit from prior learnings.

Implementation: We will have captured clinician experiences through hour-long semi-structured interviews using a convenience sampling strategy during breast cancer implementation. For the present lung cancer expansion, we will simply focus on protocol modifications based on feedback from lung cancer clinicians.

- **Assessments:** For effectiveness, we will document the number of patients referred to and enrolled into clinical trials, as assessed by chart review; PRO surveys will be assessed pre- and post-intervention (effectiveness) as will be qualitative stakeholder interviews with documented iterative changes (implementation). For Master List automation, there will be continuous comparative analysis of the automated Master List compared to current manual maintenance. Patient reported assessment tools will include: 1) Cancer Health Literacy Test (**CHLT-6**) [PMID: 36165718]; 2) The Depression, Anxiety and Stress Scale (**DASS-21**) [PMID: 36165718]; 3) The Comprehensive Score for financial Toxicity (**COST**) [PMID: 39257253]; 4) the **Sense of control** scale [PMID: 26594195]; and 5) **EQ-5D** [PMID: 28111120], a well-validated quality of life scale measuring five dimensions: mobility, self-care, usual activities, pain/discomfort, anxiety/ depression. Additionally, we will report challenges for distance travelled for patients for cancer treatment and clinical trials by recording patient home postal code, the postal code of the home cancer centre and the clinical trials cancer centre.

Sample Sizes: Sample sizes are based on practicality and feasibility concerns, and chosen to ensure that study results are sufficiently robust to provide signals of activity. Currently at each site, >30 lung cancer patients are seen monthly; ~3% get referred. The use of a LC-CTN team may increase this number to ~26% (based on current Windsor site breast cancer results). Given these assumptions, a two-sided, alpha=0.05 stepped wedge cluster randomized test with intra-class correlation of 0.001, would have in excess of 82% power to detect a difference in a cohort of 90 patients (30 per site), based on the Wald Z-test (calculated using NCSS PASS version 22.0.3).

Survey Recruitment: For this lung cancer cohort, we anticipate requiring 30 lung cancer patients per centre for surveys. Through registration into the LC-CTN program, patients/caregivers will be invited to participate in the PRO surveys. Two months after their registration, we will ask them to complete a post-intervention PRO survey. We define clinical trials broadly to mean interventional, biomarker, or observational trials. **Chart reviews:** We will review lung cancer charts of 20+ lung cancer patients per site, per month to document if the patient was referred to and if they were enrolled into a clinical trial, and the location of the trial. **Data analysis:** Lung cancer patients will be separately analyzed from breast cancer patients. **CHLT-6**: A latent class analysis will be conducted to create a two-class solution, aiming to accurately represent the CHLT-6 data and support the classification of patients into two groups based on their cancer health literacy. **DASS-21** scores/subscale will be aggregated. A linear mixed-effects model will be utilized to compare pre- and post-CTN program intervention scores within each domain, while controlling for relevant demographic and disease characteristics. **COST** analysis will involve applying a linear mixed-effects model while controlling for relevant demographic and disease characteristics, with site and patient ID serving as random effects. **EQ-5D** and **Sense of control** changes pre- and post-intervention will be analyzed using a linear mixed-effects model accounting for relevant clinico-demographic characteristics. We will follow the SPIRIT-PRO guidelines for the inclusion of patient reported outcomes in our analyses.

Impact Statement

As an older academic medical oncologist, I have personally witnessed the sustained, powerful influence of having access to clinical trials on individual patients, as well as medical management, health care delivery and health care infrastructure improvements. Nowhere is this so evident as in the setting of lung cancer. Lung cancer treatments have dramatically changed over the past half-decade alone, and there are exciting new trial outcomes every year, with improved quality-of-life and improved progression-free and overall survival, across all disease stages and subtypes of lung cancer; some have focused on new treatments, while others have focused on improving biomarkers of precision oncology. Yet, despite clear evidence of the benefit of clinical trials in the lung cancer setting, there are great inequities in clinical trial access. Busy clinicians who treat multiple cancer sites, especially in the community, often cannot afford the time to search every trial possibility, and many patients are already overwhelmed with their oncologic diagnosis and treatments. Clinical trials are ever opening and closing, such that it is near impossible for even the most subspecialized clinicians to keep track. Clinical trials accrual is a persistent, expensive and serious problem in health care delivery. Poor accrual increases costs to the entire health care system, delaying and increasing costs of discovery of new therapies. Bringing patients to available clinical trials is an important part of the answer to this challenge, one that can be initiated immediately.

The Lung CTN Study has the potential to improve radically the matching of patients to appropriate lung cancer clinical trials. Evidence exists locally in Windsor for such improvements through the involvement of a clinical trials navigator, and there is now research into how to expand this innovation into other cancer centres that have particular challenges in enrolling patients into clinical trials. However, the current research projects have focused on metastatic breast cancer in Canada, and not on lung cancer. This research proposal seeks to demonstrate the potential benefit of using Clinical Trial Navigators to improve rates of recruitment and enrolment specifically in lung cancer patients and cancer clinical trials. Demonstration of this benefit, along with insights about how to implement this efficiently and cost-effectively, can transform both patient lives and our health care system. A major strength and potential high impact of this study is that it leverages existing larger infrastructure supports, uniting them in a singular goal; these infrastructure supports include the 3CTN, CARMA-BROS network, CIHR-funding and industry funding. There is even potential in the future to link up with other entities such as PMATCH, a Genome-Canada funded precision oncology-clinical trial matching program, that is already collaborating with 3CTN and is now in negotiation with CARMA-BROS to work together across Canada.

Access to innovative treatments to all Canadian patients, unrestricted by barriers, can lead to more rapid development of cancer therapies. Increased enrolment into trials can encourage industry and academic entities to invest in clinical trials in Canada. Individual patients can have improved quality and quantity of life. Clearly increased access and enrolment into clinical trials will advance lung cancer research. It will directly impact patients benefiting from these new treatments in the short term, more rapidly lead to new and innovative treatments in the intermediate term, and lower mortality and morbidity of lung cancer in the long term.

Thus, gold standard Clinical trials will allow the generation of the highest level evidence as to how to optimize patient care, improve treatment outcomes, and reduce lung cancer burden to society.

Public, non-scientific summary (448 words).

Access to clinical trials is not equitably distributed across Canada, with significant geographic disparities. The rate of trial enrollment is lowest in rural populations and at community hospitals, which account for 65% of hospitals in Canada. The lack of availability of clinical trials in the community setting is cited as the main barrier to trial enrollment in 30-60% of people living with cancer. In lung cancer patients, clinical trials have provided early access to life-prolonging and sometimes life-saving therapy, leading to improved survival and quality of life.

One potential solution to improving patient access to clinical trials is the use of clinical trial navigators, which are individuals hired specifically to track patient information and link it with continuously updated databases of active clinical trials. In this way, as patients require new treatments, their information is matched to currently available trials across the country. This clinical trial navigator program was first developed in Windsor, Ontario and has shown major increases in the rate of referrals for clinical trials and successful enrolment into these trials. Before this innovative approach is deemed a success, evidence has to be gathered to show that what was observed in Windsor can be replicated in other centres.

Currently, this approach is being tested for metastatic breast cancer patients and expanded to include Thunder Bay and Winnipeg, as part of a research study. In our study, we will expand this approach to include lung cancer patients and lung cancer trials. We will work with two national networks, the Canadian Cancer Clinical Trials Network (3CTN) and the Canadian Cancers with Rare Molecular Alterations Basket-umbrella Real-world Observational Study (CARMA-BROS) to facilitate this expansion. In this study we will first measure the increase in number of referrals and enrolment in clinical trials after introducing clinical trials navigators to Windsor, Winnipeg, and Thunder Bay. Patient satisfaction of this approach will also be measured. Secondly, we will collect data on any challenges in introducing these navigators at the three cancer centres, which will help make future expansions smoother in other centres. We will thirdly test out artificial intelligence approaches to automatically update the clinical trial lists and match patients to open trials.

The ultimate goal of this research is three-fold: (a) to demonstrate the benefit of using clinical trial navigators to improve lung cancer patient access to clinical trials; (b) to develop and test out methods of bringing clinical trial navigators into a cancer centre, so that this can be done efficiently at more centres across Canada; and (c) to transform the culture of lung cancer treatment and management to include clinical trial consideration in everyday management of lung cancer patients.

Budget: **Total requested: $49,999**

1. 0.15 FTE coordinator each at Thunder Bay, Windsor, and Manitoba for 1 year. Total = 0.45 FTE. $50,000 Salary + 25% Fringe and benefits x 0.45 = **$28,125**. Their time will be used to focus on ensuring the completion of patient reported outcome surveys for all eligible patients, reviewing patient charts and entering patient data into the CTN system for clinical trials searches. These coordinators already exist and would have at least a Bachelor's degree and 1 year of experience. These coordinators are already working on the CIHR/Breast Cancer Canada funded CTN research proposal for metastatic breast cancer. (See below for time period by centre)
2. Data cleaning and analysis: $100 x 30 hours = **$3,000**; Katrina Hueniken is a biostatistician for CARMA-BROS. She has 9 years of experience, and two Masters degrees: MPH (Epidemiology, Dalla Lana School of Public Health) and MSc (Biostatistics, University of Toronto). (Months 5-17)
3. Software developers to integrate artificial intelligence, identify potential trials from five different websites: build and maintenance of lung cancer Master Lists: **$7,500**. This cost is based on similar efforts funded by Breast Cancer Canada for the metastatic breast cancer clinical trials navigator research project. (Months 1-12)
4. 0.15 FTE Central coordinator at Princess Margaret: $61,150 x 1.24 (fringe and benefits) x 0.15 = **$11,374**. This role is to ensure coordination across all three sites, harmonization of processes across sites, monitoring, and quality assurance. Faisal Al-Agha is a senior CARMA-BROS project manager, who has been handling the data quality assurance and day-to-day site management for over 12 CARMA-BROS sites. He will be handling the day-to-day management of the local coordinators and data integrity. He has a Bachelor's degree and three years of experience working with CARMA-BROS. (Months 1-12)
5. It is impossible to quantify the specific contribution of CIHR, Breast Cancer Canada, philanthropic, Academic, and Industry support for 3CTN, the metastatic breast cancer clinical trials navigator project, and CARMA-BROS. Each of these other funding sources have helped to build and maintain the infrastructure required to support this lung cancer pilot, the LC-CTN study. Without these other infrastructure supports, the current proposal could not be accomplished with the current budget.

Timelines associated with Budget:
All centres: REB Amendments: Months 1-2

Center 1 (months 1-12): Pre-implementation Months 1-2; Implementation Month 3; Washout Month 4; post-implementation Month 5-6

Centre 2 (months 3-14): Pre-implementation Months 4-5; Implementation Month 6; Washout Month 7; post-implementation Months 8-9

Centre 3 (months 5-16): Pre-implementation Months 7-8; Implementation Month 9; Washout Month 10; post-implementation Months 11-12

Analyses: Months 5-17
Report / Publication: Months 16-18

The names of the investigator(s) and CCVs for the PI and any co-PIs.

Our Research Team is comprised of:

Dr. Geoffrey Liu (nominated PI), lung cancer medical oncologist, is the overall PI of the CARMA-BROS network. A CCV is provided.

Dr. M Delisle (co-PI) is a surgical oncologist in Winnipeg who leads the Breast Cancer Canada funded CTN expansion pilot SW-RCT**.** She is a CARMA-BROS site co-PI. A CCV is provided.

Dr. Caroline Hamm (co-PI), medical oncologist in Windsor, has led the Clinical Trials Navigator project since inception in 2015. She supervises the day-to-day operations of the CTN program, as well as the scholarly activities of the CTN team. She is a CARMA-BROS site PI. A CCV is provided.

Dr. Doris Howell, international leader in PRO will direct the PRO components of this study. She and Dr. Liu previously co-led the CCO-funded ONPROST (Ontario Patient Reported Outcomes of Symptoms and Toxicity) network.

Katrina Hueniken is a biostatistician of the CARMA-BROS network study.

Faisal Al-Agha is a project manager of the CARMA-BROS network study.

MaryAnn Bradley, a lung cancer survivor and long-time advocate, will provide advice regarding patient facing materials.

Carrie Iszak, Splice Technology serves as the information technology lead, working with Dr. Hamm**.**

Site PIs are all medical oncologists and CARMA-BROS site PIs: **Shantanu Banerji** (Winnipeg, who is site co-PI along with Megan Delisle), **Olexy Aseyiv** (CARMA-BROS site-PI at Thunder Bay), **Caroline Hamm** (who is also CARMA-BROS site co-PI at Windsor).

Aaron Schimmer, MD, PhD, FRCPC
Director, Research
Princess Margaret Cancer Centre
7-504, 610 University Avenue
Toronto, Ontario M5G 2M9
Phone: (416) 946-2068
Email: aaron.schimmer@uhn.ca

February 04, 2025

Lung Cancer Canada
133 Richmond St W. Suite 208
Toronto ON M5H 2L3

Re: Letter of Support for Dr. Geoffrey Liu's application for a Lung Cancer Canada - Lung Ambition Award

Dear Research Committee

As Research Director of the Princess Margaret Cancer Centre, University Health Network it is my pleasure to provide this letter of institutional support for Dr. Geoffrey Liu's application for a Lung Cancer Canada - Lung Ambition Award titled "The Lung Clinical Trials Network Study: Examining the impact of a Lung Cancer Clinical Trials Navigator (LC-CTN) on Patient Reported Outcomes and Participation in Clinical Trials".

Dr. Liu is a Senior Scientist at the Princess Margaret Cancer Centre (PM), UHN and a Professor of Medicine in Medical Biophysics, Pharmacology and Toxicology, Institute of Medical Science at the University of Toronto, and Professor of Epidemiology at the Dalla Lana School of Public Health at the University of Toronto. He also holds the M. Qasim Choksi Chair in Lung Cancer Translational Research at PM. He is internationally recognized for lung cancer research and leads the Princess Margaret Lung-CALIBRE (Lung Cancer And Liquid biopsy, Informatics, Breathomics, Radiologics for Early detection) program. He also leads the Clinical-Outcome Studies of the International Lung Cancer Consortium (COS-ILCCO) and is the PI of the CAnadian Rare Molecular Alteration Basket-umbrella Real-world Observational Study (CARMA-BROS). A substantial portion of his research involves supporting advancements of novel therapies, improving lung cancer screening, implementation, and patient-reported outcomes.

The research builds on ongoing efforts to enhance lung cancer care by focusing on improving the timeliness and coordination of patient access to clinical trials. This research aims to evaluate the impact of a Lung Cancer Clinical Trials Navigator (LC-CTN) in streamlining trial enrollment, reducing delays, and optimizing patient care pathways. Additionally, the study addresses disparities in clinical trial access, particularly for patients in rural regions and community oncology centers, where opportunities for participation are often limited. As a proof of principle, the findings will generate empirical data on the effectiveness of patient navigation in expanding equitable access to lung cancer clinical trials, providing valuable insights for healthcare institutions and policymakers to inform future national implementation strategies.

On behalf of the institution, I confirm that the proposed research is feasible, and Dr. Liu has full support.

Sincerely,

Aaron Schimmer, MD, PhD, FRCPC
Director, Research
Senior Scientist, and Staff Physician,
Princess Margaret Cancer Centre
Professor, University of Toronto