Fondation Brain Canada Foundation

CANADIAN PARTNERSHIP AGAINST CANCER
PARTENARIAT CANADIEN CONTRE LE CANCER

Cancer Research Society

THE TERRY FOX RESEARCH INSTITUTE
L'INSTITUT DE RECHERCHE TERRY FOX

Master's Award Recipients

Applicant Institution	**Project Title** Summary Research Supervisor(s) Funding Partner (if applicable)	**Award** Duration
Dr Mathieos Belayneh BC Cancer, Vancouver, BC		**$65,000** 2024-2026

Finding new ways to treat nerve pain after chemotherapy to improve quality of life

Dr Mathieos Belayneh is working with people with debilitating nerve pain after chemotherapy treatment to investigate a new treatment to reduce their pain and improve quality of life. Although chemotherapy is very effective at treating many cancers, it comes with a host of short- and long-term side effects that people living with and beyond cancer experience. One of these is chronic pain in the nerves, including in the hands and feet. The pain can be debilitating, leaving those who go through chemotherapy unable to work or do everyday activities. Currently, the only approved drug for this condition, duloxetine, only works in some people and often provides only mild relief from symptoms. With funding from the Canadian Cancer Society, Dr Mathieos Belayneh is running a trial to investigate whether methadone, a drug sometimes used to manage chronic pain, is more effective at treating pain after chemotherapy treatment than duloxetine. The research team will split the trial participants into two groups, one receiving methadone and the other receiving duloxentine, with the participants not knowing which drug they are receiving. The researchers will measure pain and quality of life, as well as adverse effects of the drugs in people participating in the trial. If successful, this project could lead to a more effective way of treating severe nerve pain after chemotherapy treatments, improving quality of life for people living with and beyond cancer.

Philippa (Pippa) Hawley, BC Cancer

Robert Howden **$32,500**
Queen's University, Kingston, ON 2024-2025

Investigating if people with lower incomes are at higher risk of being diagnosed with advanced gastric cancer and dying from the disease

Robert Howden is evaluating how income level is related to the chance of being diagnosed with advanced gastric cancer and survival rates in order to improve access to earlier diagnoses and increase survival. Around half of all people with gastric cancer in Canada are diagnosed at a late stage, with only 4% of these people surviving 5 years or more after diagnosis. There is some evidence that socioeconomic status, including income level, is correlated with the chance of diagnosis and survival from gastric cancer. With funding from the Canadian Cancer Society, Robert is working with a team including a person with lived experience of gastric cancer to investigate whether lower income is correlated with an increased chance of developing advanced gastric cancer and a decreased likelihood of surviving it. The researchers will analyze Canadian census data and health databases to investigate any correlations between income level and gastric cancer diagnoses and survival. If successful, this project will provide new insight as to which people in Canada are most at risk of developing and dying from gastric cancer and could lead to changes in public health policy and cancer care to help people with low incomes.

Alyson Mahar, Queen's University

Jordan Meikle **$32,500**
Wilfrid Laurier University, Waterloo, ON 2024-2025

A better way to diagnose cognitive impairment after chemotherapy

Working with breast cancer survivors, Jordan Meikle is developing and testing a non-invasive method of detecting cognitive side effects caused by chemotherapy treatment to improve their health and quality of life. Although more people are surviving cancer and for longer, many cancer survivors experience significant health challenges, sometimes for many years after their treatment. Chemotherapy can cause cognitive impairment that results in a variety of symptoms, including fatigue and issues with concentration and memory loss. For some people, these symptoms resolve after time, but many cancer survivors are left with chronic cognitive symptoms and left without adequate care and support to manage these side effects, which can be debilitating. With Canadian Cancer Society funding, Jordan is working with a team to develop a new way of detecting these cognitive symptoms early so that cancer survivors who experience them can access suitable care and support. The researchers will work with 20 breast cancer survivors to collect data about their cognitive functioning and mental health and then test the non-invasive method to detect cognitive impairment. If successful, this project would result in a better way to diagnose cognitive impairment in cancer survivors, leading to better care for them and improving their quality of life.

Nirosha Murugan, Wilfrid Laurier University

Samuel Peters **$32,500**
Wilfrid Laurier University, Waterloo, ON 2024-2025

Developing a novel silk-based drug delivery system to overcome drug-resistance in melanoma

Samuel Peters is testing a new method to deliver molecular cancer drugs that trigger the immune system to target melanoma that has spread to other parts of the body. Melanomas are a type of skin cancer that, if diagnosed early, can often be successfully treated. However, when melanoma spreads to other parts of the body, it becomes resistant to many drugs and is extremely difficult to treat. People with advanced melanoma face a poor prognosis, making the development of innovative therapies crucial to improving their survival rates. With funding from the Canadian Cancer Society, Samuel Peters is developing an innovative treatment for metastatic melanoma using tiny strands of genetic material called double-stranded RNA (dsRNA) to enhance the immune system's ability to target cancer. Due to the fragility of dsRNA, a protective carrier is required to ensure its stability and effective delivery into cells. To address this, Peters and his team are designing silk-based nanoparticles to encapsulate and transport the genetic material directly into melanoma cells. The therapy's impact will be assessed in both melanoma cell lines and preclinical models, providing crucial insights into its potential efficacy. If successful, this project could lead to the development of an innovative new treatment method for people who have melanoma that has spread to other parts of the body, increasing their survival.

Nirosha Murugan, Université Wilfrid Laurier

Co-supported by the Cancer Research Society

PhD Candidate Award Recipients

Applicant Institution	**Project Title** Summary Research Supervisor(s) Funding Partner (if applicable)	**Award Duration**

Rober Abdo
Western University, London, ON

$94,000
2024-2026

Understanding why some breast cancers spread to the brain

Rober Abdo is investigating molecular changes in breast cancer cells which enable them to spread to the brain. Although new treatments and earlier diagnosis have improved breast cancer outcomes, tumour cells can spread to the brain in some people, resulting in a poor prognosis. Researchers still don't understand why this happens and investigating the molecular changes needed for breast cancer cells to survive and form tumours in the brain could lead to better therapeutic approaches. With funding from the Canadian Cancer Society, Rober Abdo is using tumour samples from patients with breast cancer, which has spread to the brain, to understand more about why this happens and possible ways to treat it. The research team will use molecular analysis techniques on the breast and brain tumour samples from each patient, as well as brain tissue samples surrounding the tumour. They will also use preclinical models to further investigate promising therapeutic targets identified by analysis of the patient samples. If successful, this project would lead to a new understanding of how some breast cancers spread to the brain and will identify new targets for therapies which could improve outcomes for people with breast cancer which has spread to the brain.

Qi Zhang, Lawson Health Research Institute
Shawn S.C. Li, Western University

Co-supported by the Brain Canada Foundation

Nikolay Alabi **$94,000**
University of British Columbia, Vancouver, BC 2024-2026

Using Artificial Intelligence to predict treatment responses in bladder cancer

Nikolay Alabi is finding new ways to predict which people with muscle invasive bladder cancer will respond to chemotherapy and immunotherapy drugs, sparing them invasive surgeries. Approximately a quarter of people with bladder cancer are diagnosed when their cancer has already spread to the muscle wall of the bladder. These people have a high chance of their cancer spreading to other parts of the body and are often treated with chemotherapy and high-risk surgery to remove the bladder. This procedure drastically alters their quality of life and still only comes with a 50% chance of surviving for 5 years or more. New treatment strategies are urgently needed to improve survival and quality of life after treatment. With Canadian Cancer Society funding, Nikolay Alabi is studying tumour samples donated by people with muscle-invasive bladder cancer to identify biomarkers which can predict which people will respond to therapies. By using clinical data from these patients, combined with molecular and genetic analysis of their tumour samples, the research team will use Artificial Intelligence techniques to identify which people will respond to chemotherapy and immunotherapy treatments. If successful, this project would allow researchers to predict which people with muscle-invasive bladder cancer will respond to therapy, sparing them surgery to remove the bladder, drastically improving quality of life and survival.

Ali Bashashati, University of British Columbia

Co-supported by the Cancer Research Society

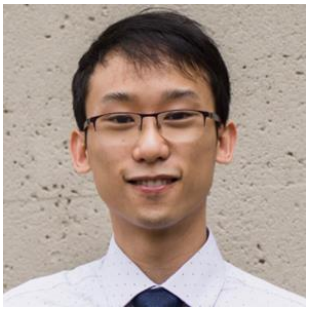
Rahbika Ashraf **$94,000**
University of Guelph, Guelph, ON 2024-2026

Evaluating dietary nutrients to lower inflammation and prevent breast cancer

Rahbika Ashraf is investigating whether nutrients found in fish, seafood and nuts might have anti-inflammatory effects that could prevent some breast cancers. Despite recent advances in the treatment and early diagnosis, breast cancer remains a significant health issue in Canada, accounting for 13% of cancer-related deaths in Canadian women and an over $2 billion cost to the healthcare system. Evidence has shown that inflammation may be driving some cases of breast cancer and that anti-inflammatory strategies might be able to prevent these cancers, but little is currently known about what kind of interventions might be able to do this. With Canadian Cancer Society funding, Rahbika Ashraf is investigating the anti-inflammatory properties of nutrients called omega-3 polyunsaturated fatty acids, which are found in seafood, fish oils and walnuts. The research team will use preclinical models of breast cancer to test the effect of omega-3s on cancer development and inflammation. If successful, this project could lead to new ways to prevent breast cancer by providing new nutritional recommendations to increase consumption of omega-3s.

David W.L. Ma, University of Guelph

Ryan Au **$94,000**
Western University, London, ON 2024-2026



Using machine learning to help diagnose prostate cancer from MRI scans

Ryan Au is developing a machine learning tool that can assist physicians in diagnosing prostate cancer from MRI scans, without the need for invasive needle biopsies. One in five Canadian men will be diagnosed with prostate cancer and traditionally a needle biopsy of the prostate is performed to aid in diagnosis, which is invasive and painful. More recently, painless and non-invasive MRI scans have been recommended instead, but there is significant variability in how doctors analyze these scans risking underdiagnosis, especially of smaller tumours. With funding from the Canadian Cancer Society, Ryan Au is developing a machine learning system that can process data from prostate MRI scans and assist physicians in accurately diagnosing the disease. The research team will use clinical data, microscope pictures of prostate tumour samples and MRI scans from people who were diagnosed with prostate cancer to train the machine learning system as to how to recognize signs of prostate cancer on MRI scans. If successful, this project would lead to a more accurate way of helping physicians diagnose prostate cancer from MRI scans, sparing people invasive and painful needle biopsies.

Aaron Ward, Western University
Glenn Bauman, London Health Sciences Centre Research Inc.

Stephanie Borlase **$141,000**
University of Toronto, Toronto, ON 2024-2027

Using targeted ultrasound to get immunotherapy drugs past the blood-brain barrier

Stephanie Borlase is investigating ways to improve immunotherapies to treat people whose lung cancer has spread to the brain, improving outcomes. Lung cancer is the leading cause of cancer deaths in Canada, but immunotherapies which trigger the immune system to attack cancers have shown promise. However, when cancers spread to the brain, these immunotherapies are often ineffective as they cannot cross from the bloodstream into the brain due to the blood-brain barrier. With Canadian Cancer Society funding, Stephanie is working with a team to investigate whether focused ultrasound waves can be used to disrupt this barrier, allowing immunotherapies to reach tumours that have spread to the brain. The researchers will develop a radioactive tagged immunotherapy drug, that they can track using scans, to determine how much of the drug is in the tumour after ultrasound treatment. The team will test the safety of this tagged drug in preclinical models, before applying to use the drug in an existing clinical trial. If successful, this project could lead to a new treatment option for people who have had cancer spread to their brain, improving their chances of survival.

Raymond Reilly, University of Toronto

Co-supported by the Brain Canada Foundation

Sarah Botting-Provost **$235,000**
McGill University, Montreal, QC 2024-2026

Understanding differences in survival between women with breast cancer

Sarah Botting-Provost is investigating disparities in breast cancer incidence and survival in Canada to improve early diagnosis and survival. One in eight women in Canada will be diagnosed with breast cancer, but not all women have the same chances of being diagnosed early or surviving their cancer. Diagnosis of breast cancer at an earlier stage is linked to a higher chance of survival, but the likelihood of an early diagnosis and survival also depends on a combination of demographic, socioeconomic and lifestyle risk factors. Currently, there is a lack of research on how these factors combine to affect survival in women with breast cancer in Canada. With funding from the Canadian Cancer Society, Sarah is working with a team to use big data repositories containing information on health care system use, such as participation in screening, demographic factors including race, income, immigration status and education level, as well as lifestyle factors such as obesity, alcohol consumption, smoking and physical activity to identify why some women with breast cancer have poorer survival than others. If successful, this project could lead to a new screening policy to help diagnose more women with breast cancer at earlier stages, and guide recommendations provided to women with breast cancer, increasing their chance of survival.

Talia Malagon, McGill University

Amber Bourgeois **$94,000**
University of Victoria, Victoria, BC 2024-2026

Developing recommendations to improve access to treatment for people with cancer experiencing homelessness and/or poverty

Amber Bourgeois is investigating how to improve access to cancer care for people who experience poverty and homelessness. People who experience poverty and/or homelessness often have poorer outcomes when diagnosed with cancer. This is due to late diagnoses, difficulties in adhering to treatment regimens and barriers to accessing cancer care, including feeling unsafe or unwelcome. Community-based social care and health organizations have a vital role in facilitating positive outcomes despite these challenges. With funding from the Canadian Cancer Society, Amber is researching how community-based organizations assist people who experience homelessness and/or poverty to access cancer treatment. The team will work with individuals from these communities currently undergoing cancer treatment, as well as community organizations and clinicians who work with them across three Canadian cities. The team will then generate recommendations regarding a model of care to enable people with cancer experiencing homelessness and/or poverty to receive better access to cancer treatment. If successful, this project could lead to better access to cancer care and treatment outcomes for people with cancer experiencing homelessness and/or poverty.

Kelli Stajduhar, University of Victoria

Shreya Gandhi **$188,000**
Princess Margaret Cancer Research Tower – UHN, Toronto, ON 2024-2028

Analyzing low-oxygen areas in deadly brain tumours to counter treatment resistance

Shreya Gandhi is studying how oxygen-deprived areas of deadly brain tumours called glioblastoma (GBM) contribute to treatment resistance to improve treatment options and outcomes for people with this type of cancer. Glioblastoma (GBM) is a fatal brain tumour that currently has no effective curative therapies. Despite surgical removal of the tumour, and therapy with radiation and chemotherapy slowing the progression of the disease, GBM tumours quickly regrow. The rapid growth of this tumour means that some areas of it receive very little oxygen and nutrients, known as hypoxic regions, rendering these cells slower to divide and more resistant to drugs and radiation. Finding ways to target these slow-growing cells in hypoxic regions could improve treatments for GBM. With funding from the Canadian Cancer Society, Shreya is researching how proteins in hypoxic regions of the tumour change in response to chemotherapy and radiation treatments. Using both preclinical models and working with patient's GBM samples, the research team will tag hypoxic cells and compare proteins in both treated and untreated GBM cells to find out which proteins might influence response and resistance to treatments. If successful, this project could lead to identifying proteins that could be targeted to sensitize areas of GBM tumours to existing therapies, thereby improving outcomes for people with GBM.

Gelareh Zadeh, The Toronto Hospital (Western Division) – UHN

Co-supported by the Brain Canada Foundation

Bianca Garlisi **$94,000**
University of Guelph, Guelph, ON 2024-2026

Testing an experimental therapy to increase uptake of cancer drugs in pancreatic cancer

Bianca Garlisi is investigating whether an experimental drug could fix abnormal blood vessels surrounding pancreatic tumours, allowing chemotherapies and immunotherapies to reach them. Pancreatic ductal adenocarcinoma is an aggressive cancer, with only 10% of people with this cancer surviving for five years or more after diagnosis. These types of pancreatic tumours are typically surrounded by abnormal blood vessels, which makes it difficult for therapies to reach the tumour. New ways of effectively delivering therapies to these types of tumours are urgently needed to improve survival. With funding from the Canadian Cancer Society, Bianca Garlisi is testing a new drug which may be able to fix the blood vessels surrounding pancreatic tumours, allowing drugs to reach the tumour and kill cancer cells. The research team will use preclinical models and pancreatic cancer cells originally donated by patients to create tiny 3D structures in the lab called organoids to test whether the experimental drug increases the uptake of chemotherapy and immunotherapy by cancer cells. If successful, this project would lead to clinical trials in humans to see whether this experimental drug could increase therapy uptake in people with pancreatic ductal adenocarcinoma.

James Petrik, University of Guelph

Co-supported by the Canadian Partnership Against Cancer

Olivia Kovecses **$94,000**
McGill University, Montreal, QC 2024-2026

A new, innovative treatment strategy for acute myeloid leukemia

Olivia Kovecses is developing a new way to treat acute myeloid leukemia by targeting malfunctioning genes in blood cells. Acute myeloid leukemia (AML) is a hard-to-treat blood cancer where the bone marrow produces immature, dysfunctional blood cells in great quantities. The genetic mutations that cause AML are highly variable, meaning many people do not respond to treatments. Nearly 75% of people with AML do not survive, highlighting the urgent need for new treatment strategies. With funding from the Canadian Cancer Society, Olivia Kovecses is investigating a new type of therapy that uses very short strands of RNA to modify the function of genes that influence the blood cells to behave abnormally. The research team will design the RNA strands to precisely target genes involved in AML and package them in tiny nanoparticles to keep them intact. They will then test the therapies on AML cells and preclinical models in the lab, both alone and in combination with existing drugs for AML. If successful, this project could lead to an entirely new way to treat AML, improving outcomes for people with the disease.

Francois Mercier, Jewish General Hospital
Maureen McKeague, McGill University

Lorenzo Lindo **$94,000**
University of Calgary, Calgary, AB 2024-2026

Improving cellular therapies for people with multiple myeloma

Lorenzo Lindo is analyzing why some people with multiple myeloma become resistant to immune cell-based therapies and how to modify these therapies to make them more effective, improving outcomes. Multiple myeloma is a type of blood cancer that currently has no curative therapies. Despite this, many people with multiple myeloma are now living longer after diagnosis thanks to treatment advances. One example of these therapies is called CAR T cell therapy, and it uses a person's own immune cells, which are genetically modified to target a protein found on multiple myeloma cells. This CAR T cell therapy has extended the lives of many people with multiple myeloma, but many people ultimately become resistant to CAR T cells and relapse. With funding from the Canadian Cancer Society, Lorenzo is investigating why some people with multiple myeloma become resistant to CAR T cells. By using preclinical models, the research team will analyze the CAR T cells and other immune cells as well as the bone marrow where multiple myeloma cells originate to understand how these cells change after CAR T cell treatments and contribute to treatment resistance. The team will then use this data to construct better CAR T cell therapies that are more effective. If successful, this work would lead to the development of improved CAR T cell therapies for people with multiple myeloma, improving their responses and prolonging their lives.

Kevin Hay, BC Cancer

Co-supported by the Terry Fox Research Institute

Christian Lopez **$94,000**
Princess Margaret Cancer Centre, Toronto, ON 2024-2026

Implementing an online platform to connect cancer survivors with resources that can improve their health

Christian Lopez is implementing an online platform for connecting cancer survivors with resources and community programs to better identify which people need help and to more efficiently connect them with suitable care, improving their health and quality of life. Although survival for many types of cancer has increased significantly over the past few decades, many people who survive cancer are left with long-term side effects, which can make it difficult for them to resume their regular lives. Despite a growing awareness of these challenging health conditions, many cancer survivors do not receive adequate care and support for these issues. With Canadian Cancer Society funding, Christian is piloting the implementation of a free digital tool for cancer survivors, which asks them questions about their health and then recommends resources, community programs and services their physician can refer them to. This online platform was developed with the help of a patient advisory group and the research team will pilot its implementation within four centers across four provinces for survivors of breast, colorectal, head and neck cancers or lymphoma. The researchers will collect data on how well this digital tool is integrated into routine care, whether survivors use the resources recommended to them and the costs associated with its implementation. If successful, this project could lead to widespread use of the online platform to help connect cancer survivors with resources and help manage their long-term health conditions, improving their health and well-being.

Jennifer Jones, Princess Margaret Cancer Centre – UHN

Anikka Swaby **$188,000**
McGill University, Montreal, QC 2024-2028

Investigating different diets and the impact on the response to immunotherapy

Anikka Swaby is analyzing how different diets affect the composition of microorganisms in the gut and the effect of nutrition on immune cells to better understand how immunotherapies work for people with cancer. A type of immunotherapy called immune checkpoint inhibitors (ICI) have been very effective for the treatment of some cancers, greatly increasing survival. However, only a minority of people with cancer, including some people with obesity, respond to ICI. There is some evidence that diet and the composition of the gut microbiome, microorganisms which naturally live in the gut, are associated with an improved response to this type of therapy, but researchers don't currently know why this happens. With funding from the Canadian Cancer Society, Anikka is working with a team to investigate different diets in preclinical models, analyzing the effect of diets on microbiomes and obesity. The research will include analyzing the types of bacteria in the microbiome, as well as the effect that these have on immune cells, which could influence the response to ICI. Anikka will also look at tumour samples donated by people with lung cancer treated with ICI and samples from their gut microbiome. If successful, this research could provide an understanding of why people with obesity tend to have better responses to ICI and potential new ways to use nutrition to optimize cancer treatments, ultimately improving outcomes for people with cancer.

Daniela Quail, McGill University

Co-supported by the Terry Fox Research Institute

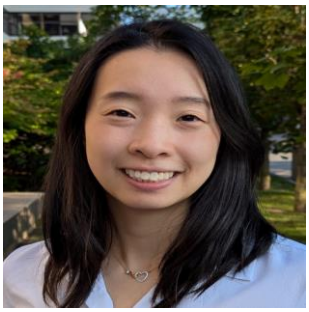
Sydney Vallati **$235,000**
Ottawa Hospital Research Institute, Ottawa, ON 2024-2029

Using viruses to boost cellular immunotherapy in triple-negative breast cancer

Sydney Vallati will develop a genetically modified virus designed to boost the response to cellular immunotherapy in people with triple-negative breast cancer. Despite recent advances in early diagnosis and innovative therapies, triple-negative breast cancer remains challenging to treat and typically has a poorer prognosis than other types of breast cancer. One of the reasons for this is that the cancer cells which make up triple-negative breast tumours are highly variable, meaning they are more likely to be resistant to treatments and be able to evade the immune system. New treatment options which overcome these hurdles are urgently needed. With Canadian Cancer Society funding, Sydney Vallati is investigating an innovative combination of immune therapies to target triple-negative breast cancer. The research team will test a genetically modified virus designed to stimulate the growth and activity of immune cells called lymphocytes already resident in the tumour. These specialized lymphocytes are naturally programmed to target the tumour but need a boost to replicate and attack the tumour, which the virus provides. The researchers will develop and test this combination of therapies in preclinical models of triple-negative breast cancer in the lab. If successful, this project could lead to a new way of treating people with triple-negative breast cancer by using viruses to boost immune cells.

Carolina Ilkow, Ottawa Hospital Research Institute
John Bell, Ottawa Hospital Research Institute

Casey Wong **$235,000**
Queen's University, Kingston, ON 2024-2029



Understanding how malfunctioning blood stem cells influence therapy response in people with cancer

Casey Wong is investigating how abnormal blood cells in people with cancer influence their response to immunotherapies to improve their outcomes. Blood cells are made in the bone marrow from specialized stem cells, which create billions of new cells every day. Sometimes, one blood stem cell becomes dysfunctional and creates substantially more blood cells than it should, often with genetic mutations, meaning they don't function properly. This phenomenon is called clonal hematopoiesis. Up to a third of people with cancer have clonal hematopoiesis and growing evidence suggests that it can influence their response to therapies as well as increase their risk of other diseases. With funding from the Canadian Cancer Society, Casey is using blood samples donated by people with cancer undergoing treatment with immunotherapy and using genetic sequencing to analyze whether they have clonal hematopoiesis. The research team will also look at whether people with cancer and clonal hematopoiesis have differences in their immune cells, which may influence their response to therapy. If successful, this project would lead to understanding how clonal hematopoiesis influences the immune system in people with cancer and their responses to therapy. This new knowledge could enable doctors to customize cancer treatments in the future to improve outcomes in people with cancer.

Michael Rauh, Queen's University

Postdoctoral Fellow Award Recipients

Applicant **Institution**	**Project Title** Summary Research Supervisor(s) Funding Partner (if applicable)	**Award** Duration

Maryam Ahmadi
Jewish General Hospital, Montreal, QC

$220,000
2024-2027

Understanding why skin cancer spreads to other parts of the body

Maryam Ahmadi is using advanced analysis methods to look at proteins that promote spread of melanoma cells to other parts of the body. Melanoma is a type of skin cancer that has a good prognosis if caught early, but it often spreads to other parts of the body. Melanoma cells do this by producing proteins that allow the cells to travel into the bloodstream and embed themselves in other organs, forming tumours that are very hard to treat. A greater understanding of the molecular changes that cause these cells to spread is vital to developing better treatments for people with this type of advanced melanoma. With funding from the Canadian Cancer Society, Maryam Ahmadi is investigating specific factors and chemical signals that control how proteins are produced in melanoma cells. Some of these are found at abnormally high levels in cancers, including melanoma and are already being targeted by drugs which are in the early stages of clinical trials. The team will use preclinical models of melanoma as well as advanced imaging analysis techniques to understand how these factors influence melanoma cells and other cells, such as immune cells, and can contribute to cancer spread and treatment response. If successful, this project would provide new understanding as to how drugs targeting cancer spread in melanoma might work, improving outcomes for people with melanoma that has spread to other parts of the body.

Wilson H. Miller, McGill University

Monyse de Nobrega **$139,666**
The Research Institute of the McGill University Health Centre, Montreal, QC 2024-2027

Using liquid biopsies to monitor treatment responses

Monyse de Nobrega is analyzing blood and urine samples donated by people with colorectal cancer to find a better way of monitoring their responses to treatment. Colorectal cancer is the third most common cancer in Canada and is normally treated with a combination of surgery and drugs. Treatment response is monitored with scans that expose patients to radiation. But repeated scans are time-consuming and expensive and do not always give a comprehensive picture of how a person with colorectal cancer is responding to treatment, because scans can only detect big changes in the disease. With funding from the Canadian Cancer Society, Monyse de Nobrega is analyzing a new test called liquid biopsy to measure the response to treatment in people with colorectal cancer. Using blood and urine samples donated by 400 people with colorectal cancer, the research team can look for tiny fragments of genetic material shed by tumours into the bloodstream. Analyzing the amount and precise composition of these fragments of genetic material and correlating this with their medical records will allow the researchers to monitor how people with colorectal cancer are responding to treatment in real time, providing a dynamic platform for personalized and adaptable treatments. If successful, this project could lead to a new way of monitoring treatment response using a minimally invasive technique in people with colorectal cancer, which spares them repeated doses of radiation from scans. In doing so, this approach would reduce side effects and potentially provide more precise treatments that increase quality of life.

Julia Burnier, The Research Institute of the McGill University Health Centre

Islam Elkholi **$220,000**
Jewish General Hospital, Montreal, QC 2024-2027

New treatment strategies for people with BRAF mutations in their tumours

Dr Islam Elkholi is investigating a specific class of mutations in a gene called BRAF to understand how they contribute to cancer progression and therapy resistance. Despite recent advances in cancer therapies, many cancers become resistant to treatment, reducing the chance of survival. A major reason for this outcome is that the genetic code in cells can change or mutate, sometimes leading to therapy resistance. A protein called BRAF is dysfunctional due to mutations in approximately 10% of all cancers. Although researchers understand why some BRAF mutations contribute to cancers and therapy resistance, some types of mutations are less understood and people with these BRAF mutations often have fewer treatment options. With Canadian Cancer Society funding, Dr Islam Elkholi is investigating how particular types of BRAF mutations modify the growth of tumours and influence their response to therapies. The research team is already involved in a clinical trial that is testing a new drug combination on people with cancer with these types of BRAF mutations. They will use samples donated by patients to explore how these BRAF mutations modify the growth of cancer cells and their response to therapies. If successful, this project could result in new treatment regimens for people with these types of BRAF mutations in their tumours, increasing their survival.

April Rose, Jewish General Hospital

Qiutong Huang **$214,000**
University of Calgary, Calgary, AB 2024-2027

Understanding how immune cells protect against the development of breast cancer

Qiutong Huang is investigating how specialized immune cells may be protective against breast cancer to improve treatment options and increase survival. Despite significant advances in treatment and early detection, breast cancer remains the second leading cause of death for women in Canada. Many people with breast cancer have their tumours become resistant to treatments and new therapeutic approaches are needed. Immune cells are vital for countering breast cancer development and influencing disease progression. Understanding exactly how these immune cells function could lead to new therapeutic approaches. With funding from the Canadian Cancer Society, Qiutong is working within a team to investigate how specialized immune cells called ILC2s protect against breast cancer development and how they change when breast cancer develops. Using genetic and molecular analysis techniques and complementary models, the researchers will decipher how ILC2s function and interact with breast cancer tissues. If successful, this project would result in new understanding about how ILC2s work and could lead to new therapeutic approaches harnessing their anti-tumour effects to improve the prognosis for Canadians with breast cancer.

Nicolas Jacquelot, University of Calgary

Andrea Johnson **$74,333**
University of Toronto, Toronto, ON 2024-2025

Developing a tool to measure quality of life in adolescents with advanced cancer

Andrea Johnson is working with adolescents living with advanced cancer to understand and measure what aspects of quality of life are important to them. Many adolescents diagnosed with cancer will not survive, while others will live with advanced cancer, sometimes for many years. Palliative care programs can improve the quality of life of people living with advanced cancer, but little is known about what aspects of quality of life adolescents living with advanced cancer prioritize and identify as meaningful. With funding from the Canadian Cancer Society, Andrea is working with adolescents with advanced cancer to develop a way to measure quality of life, so that they can receive the best possible palliative care. The research team will first interview adolescents living with advanced cancer to learn more about what is important to them and their ideas on how quality of life might be measured by care teams, in order to design a new way of evaluating these outcomes effectively. If successful, this project would lead to the development of a new method to measure quality of life in adolescents with advanced cancer, giving them better access to care which improves their quality of life.

Kimberley Widger, University of Toronto

Yuji Kamio **$139,666**
Centre de recherche du CHUM, Montreal, QC 2024-2026

Inserting a novel radioactive material into pancreatic tumours to slow down cancer progression

Yuji Kamio is working to optimize the dose planning and delivery of an innovative new cancer therapy in people with late-stage pancreatic cancer to improve outcomes. Despite decades of research, pancreatic cancer remains one of the hardest to treat malignancies, with only 10% of people surviving for 5 years or more after diagnosis. This statistic has not changed in decades and an estimated 5,900 Canadians die from the disease annually. New therapeutic strategies are badly needed to improve outcomes in people with pancreatic cancer. With Canadian Cancer Society funding, Yuji is evaluating a new therapy called Alpha DaRT in people with late-stage pancreatic cancer. Alpha DaRT works by inserting a radioactive material directly into the tumour, which kills surrounding tumour cells. Working with people with late-stage pancreatic cancer and 3D printed models, the research team will investigate the best way to insert the Alpha DaRT material, increasing the dose given to the tumour while avoiding damage to surrounding healthy tissues. If successful, this project would lead to a new therapeutic strategy for people with advanced pancreatic cancer, extending their lives while maintaining quality of life.

David Roberge, Centre de recherche du CHUM

Sarah Kronheim **$214,000**
Princess Margaret Cancer Centre, Toronto, ON 2024-2027

Identifying cells inside breast tumours which drive chemotherapy resistance

Sarah Kronheim is using genetic analysis techniques to understand why some cells inside breast tumours are resistant to chemotherapies in order to improve treatment options and outcomes. Despite many treatment advances in recent years, breast cancer remains a significant challenge as many people become resistant to conventional therapies. Breast tumours contain cancer cells with significant variability in their genetics and behaviour, including how they respond to therapies. Understanding why some cells within a tumour are resistant to therapies is crucial for optimizing treatment strategies and improving outcomes. With funding from the Canadian Cancer Society, Sarah is researching why some cells within breast tumours respond differently to chemotherapies. By using tumour samples donated by people with breast cancer and growing them in a lab, the research team will study the genetic material from single tumour cells to pinpoint differences that influence the response to chemotherapies. The team will also use gene editing to find targets that can sensitize treatment resistant breast cancer cells to chemotherapy again. If successful, this project could lead to new ways of targeting breast cancer cells that are resistant to chemotherapy, improving outcomes for people with breast cancer.

Long Nguyen, Princess Margaret Cancer Centre – UHN

Nilakshi Kulathunga **$223,000**
Sunnybrook Research Institute, Toronto, ON 2024-2027

Understanding how a specific protein influences progression in neuroendocrine cancers

Nilakshi Kulathunga is studying a protein found at high levels in neuroendocrine tumours to understand how it affects cancer progression and response to treatment. Neuroendocrine tumours are generally slow-growing tumours that arise from hormone-producing cells and are most commonly found in the pancreas and intestines. Although rare, accounting for only 1 in 50 cases of cancer, the incidence is rising and new treatment strategies to increase survival are needed. With Canadian Cancer Society funding, Nilakshi is working with a team to investigate the role of a protein called HMGB3 in neuroendocrine tumour progression and response to radiation therapy. Building on their previous work, the researchers will use cells and 3D miniature structures of pancreatic neuroendocrine tumours growing in a dish, animal studies, and computer-based analyses to understand how HMGB3 interacts with other proteins and influences cancer cell function and response to radiation therapy. If successful, this work would provide a new understanding of what HMGB3 does in neuroendocrine tumours and its role in response to radiation therapy, which could lead to better treatment options for people with neuroendocrine tumours.

Kathrin Tyryshkin, Queen's University
Iacovos Michael, Sunnybrook Research Institute

Co-supported by the Terry Fox Research Institute

Chris Lowden **$223,000**
Lunenfeld-Tanenbaum Research Institute, Toronto, ON 2024-2027

Using gene editing to identify new therapeutic targets in head and neck cancers

Chris Lowden is developing a novel gene editing approach, with the goal of identifying new drug targets for head and neck cancers and ultimately improving treatment options for these patients. Cancers of the head and neck are the sixth most common form of cancer in Canada and one of the few cancers with rising incidence. In head and neck cancer patients, mutations in a gene called KRAS are common. While treatments targeting KRAS are available, tumours often develop resistance to these drugs highlighting an unmet challenge for new targeted therapies in the clinic. With Canadian Cancer Society funding, Chris is aiming to tackle these challenges using preclinical models of head and neck cancer paired with an improved version of the gene-editing tool called CRISPR, which disrupts genetic information at precise locations. The research team will use this tool to identify all potential drug targets in KRAS-driven head and neck cancer. The project will also uncover how these genes interact with genes already implicated in cancer progression. If successful, this project could result in the identification of new therapeutic targets for head and neck cancers, leading to improved treatment options and better prognosis for patients.

Daniel Schramek, Mount Sinai Hospital

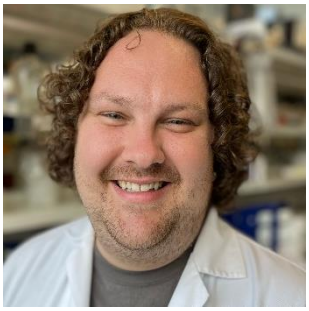
Ruth Mwatelah **$214,000**
McGill University, Montreal, QC 2024-2027

Understanding how the genital microbiome influences the risk of developing HPV-related cancers

Ruth Mwatelah is investigating how the type of bacteria naturally resident in the genital area could influence the risk of developing HPV-related cancers, such as those that affect the cervix and penis. Human papillomavirus (HPV) is a major cause of cervical cancer in women and penile cancer in men, with most infections being sexually transmitted. Despite an available vaccine against HPV, uptake remains low and many people are still infected with HPV. In most people, the immune system effectively clears the infection, but in some people the virus persists, increasing their risk of cancer development. With funding from the Canadian Cancer Society, Ruth Mwatelah is investigating whether "healthy" bacteria that naturally reside in the genitals influence whether a person's immune system is able to effectively tackle HPV. The research team will investigate a particular type of bacteria called Lactobacillus species, which can vary between people and in response to hormone changes and other factors like sex. By analyzing samples collected from 500 women and their male sexual partners, the researchers will investigate how these bacteria are related to the risk of developing HPV-related cancers. If successful, this project wiould lead to a greater understanding of how the genital microbiome composition relates to the risk of developing HPV-related cancers, possibly leading to treatments to modify the microbiome and prevent cancers.

Talía Malagón, McGill University

Dakota Rogers **$214,000**
McGill University, Montreal, QC 2024-2027



Investigating how the time of day impacts immune cell function to improve lung cancer treatment

Dakota Rogers is analyzing how the time of day impacts immune cell function in lung cancer treatment and the chance of the cancer spreading to improve treatments and outcomes. Lung cancer is the most common cause of cancer-related death in Canada and despite recent treatment advances that prolong life in some people with lung cancer, therapies still fail to work for a significant number of people. People with a greater number of immune cells called neutrophils in their tumours tend to have worse prognoses. These neutrophils may be contributing to poor treatment responses. With funding from the Canadian Cancer Society, Dakota is investigating how lung cancer cells can influence neutrophils to function differently and allow the tumour cells to spread to other organs. The research team will use preclinical models of lung cancer to evaluate whether the neutrophils alter their functions at different times of the day and night, which could influence when people with lung cancer should receive therapies. Using advanced computing, the researchers will also test new therapeutic strategies that target neutrophils to evaluate their potential for use in people with lung cancer. If successful, this project may play an important role in informing when treatment strategies could be given and how disruptions in people's internal sleep-wake cycle (such as shift work, psychological stress, parental responsibilities, financial stress, etc) impact treatment of lung cancer.

Daniela Quail, McGill University

Co-supported by the Terry Fox Research Institute

Shirin Shallwani **$145,666**
University of Alberta, Edmonton, AB 2024-2026

Exercise rehabilitation support for Canadians with advanced cancer

Shirin Shallwani is working with people living with advanced cancer to find out what type of support they need to pursue exercise-based rehabilitation programs that can help optimize their health. People diagnosed with cancer at advanced stages are living longer thanks to advances in treatment. However, many of the therapies they receive come with significant side effects, often affecting their physical health long-term. Exercise is beneficial to many people with advanced cancer, but engaging in exercise can be challenging due to symptoms such as fatigue and pain, mobility issues, ongoing cancer treatments and work and family commitments. With funding from the Canadian Cancer Society, Shirin Shallwani is working with people with advanced cancer to explore their preferences for exercise support and to design tailored programs to help them. The research team will survey over 200 people with advanced cancer to ask them about their levels of pain, fatigue and mobility and their rehabilitation needs. The team will then examine existing services and design and test new approaches to help people with advanced cancer engage in exercise. If successful, this project could result in better support for Canadians with advanced cancer who want to pursue exercise rehabilitation, optimizing their overall health and quality of life.

Margaret McNeely, University of Alberta

Matthew Warkentin **$223,000**
University of Calgary, Calgary, AB 2024-2027

Using Artificial Intelligence to optimize lung cancer screening in Canada

Matthew Warkentin is using data from people at high risk of lung cancer to evaluate how artificial intelligence can optimize their screening recommendations to improve early cancer detection and reduce the impact of lung cancer. Lung cancer is the leading cause of cancer-related deaths in Canada, with over 20,000 people dying from the disease annually. Using computed tomography (CT) is effective in diagnosing cancers at an earlier stage among people who have a high likelihood of developing lung cancer, giving them more effective treatment options and a greater chance of long-term survival. Despite this, there are very few screening programs for early detection of lung cancer in Canada and there are several important questions still to be answered, including who should be screened, how often they should be screened, and what the cost is to Canada's healthcare system. With funding from the Canadian Cancer Society, Matthew is working with a team to evaluate existing data collected from over 1,000 people screened for lung cancer in Alberta who are considered to be at high-risk of developing the disease. The research will evaluate if artificial intelligence applied to CT scans can help clinicians decide how much screening is needed and the right timing for screening for people at high-risk of lung cancer. If successful, this project would lead to new ways to use artificial intelligence to decide which people at high risk of lung cancer need screening and how often, allowing for earlier detection of lung cancer as well saving the healthcare system money and sparing people unnecessary screening.

Darren Brenner, University of Calgary
Alain Tremblay, University of Calgary