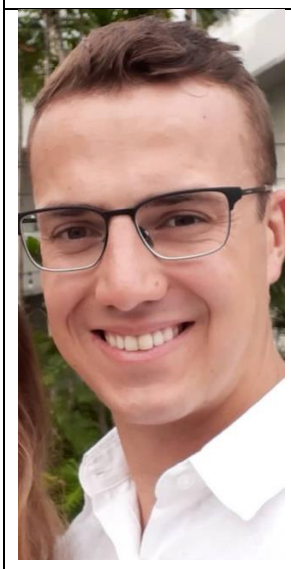
TBCRU Pamela Greenaway-Kohlmeier Translational Breast Cancer Research Unit

BREAST CANCER SOCIETY of Canada™

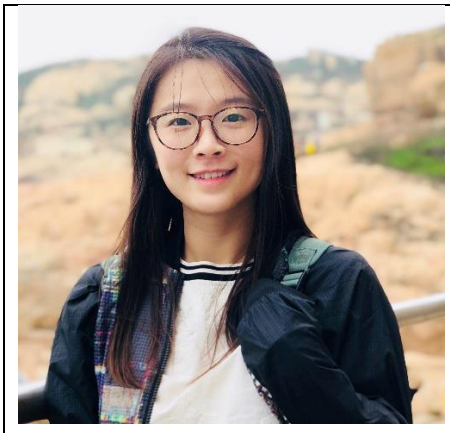
LA SOCIÉTÉ DU CANCER DU SEIN du Canada MC

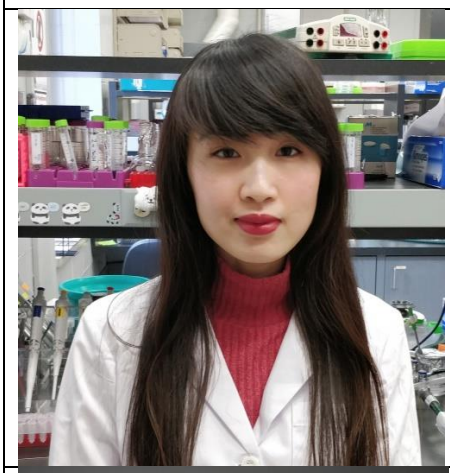
	**Britney Messam** is an MSc student in the Department of Biochemistry, under the supervision of Dr. Eva Turley. Her project aims to use tissue samples and 3D cell cultures of Triple-Negative Breast Cancer (TNBC) to test the theory that expression of the metastasis-specific gene Rhamm predicts sensitivity to drugs that inhibit the commonly activated MEK signaling pathway. This research will allow her to assess the utility of using RHAMM as a marker to identify highly invasive TNBC cells that are sensitive to MEK targeted therapy, which in turn may provide a new avenue for clinical TNBC treatment.
	**Julia Gevaert** is an MSc student in the Department of Medical Biophysics under the supervision of Dr. Paula Foster. Julia's work involves exploring a new imaging technique, called Magnetic Particle Imaging, to image breast cancer. With this new research, we can better understand how and why breast cancer spreads throughout the body. This will help us develop new ways to better treat breast cancer.

	**Kierstin Melo** is an MSc student in the Department of Medical Biophysics, under the supervision of Dr. Paula Foster. Her research is focused on developing a new imaging modality called Magnetic Particle Imaging (MPI), to detect and track breast cancer that spreads to the brain. This is very difficult to image using other techniques, such as Magnetic Resonance Imaging (MRI). She is developing methods to label, detect, and track breast cancer cells to better understand how and why secondary tumours begin to grow in the brain. She compares MPI and MRI imaging techniques to see how MPI can fill in the gaps in the cancer imaging field.
	**Liam Ratushny** is an MSc student in the Department of Pathology and Laboratory Medicine under the supervision of Dr. Fred Dick and co-supervision of Dr. Chris Howlett. His research focuses on the characterization of breast cancer cell responses to chemotherapy. The goal of the project is to build a predicted pathway of responses to these drug treatments and assess it against breast cancer patient tissue samples. From these findings, markers that can predict resistance or efficacy of treatment can be identified.
	**Melissa Evans** is an MSc student in the Department of Medical Biophysics, under the supervision of Dr. John Ronald. Her work focuses on developing novel imaging tools to track chimeric antigen receptor T (CAR-T) cell therapy in breast cancer patients. CAR-T cells are a form of personalized cancer treatment. As some of the body's most important immune cells, a patient's own T cells are collected, grown in the lab, and engineered with a CAR to target and kill breast cancer cells once reinfused back into the patient. In her research, Melissa will apply advanced genome editing tools called clustered regulatory interspaced short palindromic repeats (CRISPR), which act as "DNA scissors", to specifically and safely integrate the CAR and imaging genes into T cells. With this tool we will be able to precisely visualize CAR-T cells within the body, which will provide critical life-long information about how the therapy is performing in individual breast cancer patients.

	**Sean McRae** is a MSc student in the Department of Medical Biophysics, under the co-supervision of Dr. John Ronald and Dr. Timothy Scholl. He is continuing the development of a system that will allow breast cancer metastases to be imaged with a high degree of accuracy. Through use of a transporting system, cancer cells are able to take up an administered contrast agent that increases their visibility relative to surrounding tissue on an MRI. The ability to visualize cancer cells in the growing tumour and as they spread throughout the body would revolutionize our understanding and treatment of breast cancers, as they often spread from the primary tumour to the lungs and lymph nodes.
	**Sierra Pellizzari** is an MSc student in the Department of Anatomy & Cell Biology, under the supervision of Dr. Armen Parsyan (co-supervisor Dr. Alison Allan). Her project aims to establish clinically relevant novel translational models from breast cancer patient tumours grown in a petri dish as organoids and to test effects of the novel drug CFI-400945 as a single agent or in combination with radiation treatment. If the study confirms the anticancer effects of combination treatment in these patient-derived models, it is expected that this treatment would be tested in clinical trials with an intent to translate findings into clinical practice in order to improve survival outcomes of patients with metastatic breast cancer.
	**Braeden Medeiros** is an MSc student in the Department of Anatomy and Cell Biology, under the supervision of Dr. Alison Allan. Despite advances in diagnosis and treatment, breast cancer remains a clinical challenge. This is due to poor understanding regarding the mechanisms driving the movement (metastasis) of cancer from the breast to distant organs, a process that causes the majority of breast cancer mortalities. The lung is one of the most deadly sites of breast cancer metastasis, particularly for patients with an aggressive molecular subtype of breast cancer called triple-negative (TN) disease. We have previously observed that TN breast cancer has a particular propensity for migrating towards and growing in the lung, potentially through interactions with lung-derived proteins. This

	proposal will assess how molecular subtype influences the ability of the lung to produce/attract specific factors that support breast cancer metastasis, and to identify when, why and how lung metastasis develops in a subtype-specific manner. The resulting data could facilitate improved clinical management, including earlier detection, treatment, and/or prevention of metastasis.
	**Natasha Knier** is a PhD student in the Department of Medical Biophysics, under the supervision of Dr. Paula Foster. Her project focuses on studying cancer cells that remain inactive or "dormant" in the brain, and are unable to be detected clinically. By using early radiotherapy to minimize tumour growth and specialized magnetic resonance imaging (MRI) techniques, she is able to follow these "dormant" cancer cells that may contribute to cancer recurrence. Lifestyle factors causing inflammation are associated with breast cancer recurrence, and so she aims to study the effects of inflammation on these cancer cells to provide more information to patients and healthcare providers on the increased risk of breast cancer recurrence that inflammation may present.
	**Sawyer Badiuk** is a PhD student in the Department of Medical Biophysics, under the supervision of Dr. Eugene Wong and Dr. Jeff Chen. Sawyer studies the efficacy of breast cancer brain metastases treatment using novel imaging techniques. Her research involves monitoring the response of the brain and cancer cells following radiation treatment, with the overall goal of preventing new and recurring brain metastases.

	**Shanshan (Jenny) Zhong** is a PhD candidate in the department of Biochemistry, under the supervision of Dr. Shawn Li. It is commonly believed that immune cells such as T cells in the microenvironment of breast cancer can effectively inhibit the growth of the tumor. To avoid being killed by cytotoxic T cells, tumors often express a kind of transmembrane protein called PD-L1 which would bind to its receptor PD-1 on T cells so to turn off the T cell-mediated immune responses. Her project aims to develop a novel class of peptide inhibitors targeting on PD-1 axis signaling and evaluate their therapeutic potential in Breast cancer treatment. Compared to current therapeutic antibodies, peptide inhibitors have several advantages as drug candidates, including lower manufacturing costs, reduced immunogenicity, and better organ or tumor penetration. With these peptides, it also helps us to better understand the mechanism of PD-1/PD-L1 signaling in Breast cancer.
	**Tasnim Reza** is a Ph.D. student in the Department of Biochemistry, under the supervision of Dr. Michael B. Boffa. Her research focuses on the anti-metastatic and anti-angiogenic role of two proteins, thrombin activatable fibrinolysis inhibitor (TAFI) and thrombomodulin, in the breast cancer microenvironment. This research will encompass the mechanistic study of breast cancer cells and its response to a protein drug based on thrombomodulin in test tube and mouse models. The results obtained through this research will allow the initiation of translation of the novel anti-metastatic therapy into additional pre-clinical trials and ultimately into clinical trials. As metastasis is the leading cause of cancer-related mortality, this research promises a new path for the development of anti-metastatic therapies.

	**Veronica Dubois** is a PhD student in the Department of Medical Biophysics, under the supervision of Dr. John Ronald and co-supervision of Dr. Paula Foster. Veronica's project focuses on developing molecular imaging techniques to study chimeric antigen receptor (CAR) T cells, a cancer cell therapy made up of immune cells that have been modified to find and kill cancer cells in the body. Her project involves adding reporter genes to CAR-T cells to enable their detection during treatment using non-invasive magnetic resonance imaging. The valuable information provided by these imaging techniques will aid in the development of new CAR-T cell therapies that may be safer and more effective against breast cancer.
	**Vy Ngo** is a PhD student in the Department of Pathology and Laboratory Medicine, under the supervision of Dr. Martin Duennwald. She is investigating mechanisms of therapy resistance in breast cancer and designing a novel approach using small molecules to enhance the efficacy of cancer therapeutics. Cancer cells that survive initial treatment often metastasize to other parts of the body, thereby posing a unique clinical challenge. Her approach may serve as a new treatment strategy for therapy-resistant breast cancer and metastasis.
	**Vasudeva Bhat** is a Postdoctoral Fellow in the Department of Anatomy and Cell Biology, under the supervision of Dr. Alison Allan and Dr. David Palma. His project focuses on investigating the potentially paradigm-shifting concept that breast cancer patients with "oligometastasis" may represent a treatable (and potentially curable) subset of patients. Oligometastasis refers to a disease stage where the cancer has spread beyond the breast but is not yet widely metastatic. The goal of this project is to develop and validate a multi-biomarker approach for defining the oligometastatic state in breast cancer using minimally-invasive blood tests ("liquid biopsies"). We will carry out combined assessment of circulating tumor cells, circulating tumor DNA, and host immune cells; and compare these biomarkers to patient survival and disease progression following radiation treatment. Thus,

	a blood-based multi-biomarker panel may represent a useful prognostic and/or predictive approach in breast cancer patients with oligometastatic disease.