Parkinson Canada

Funded Researcher Profiles

2025

parkinson.ca

Pilot Project Grants

Dr. Anthony Incognito

Memorial University

Transcutaneous spinal cord stimulation for managing orthostatic hypotension in people with Parkinson's disease

$75,000 over one year

Project Description: Our research project is exploring a new way to help people with Parkinson's disease who experience a sudden drop in blood pressure when they stand up (a condition called orthostatic hypotension). This blood pressure drop can cause dizziness, fainting, and falls. Current treatments for it are limited, which is why we have embarked on testing a new approach. We are testing an electrical stimulation technique, applied through the skin to the spine, called transcutaneous spinal cord stimulation. The goal is to see if this electrical stimulation approach can boost the activity of nerves that normally keep blood pressure stable, thereby preventing those dangerous drops. If successful, this approach could lead to a new, non-drug therapy to improve patients' day-to-day health and safety.

Importance of Funding: This research grant is crucial for advancing our work and making new discoveries possible. The funding provides the resources we need to carry out the study – for example, it supports the recruitment of participants, the purchase of specialized equipment and supplies, and the staffing (such as a graduate students and research assistants) required to run the experiments. While there is an obvious direct benefit to the research, all these components that the funding provides also enriches the laboratory learning environment, which works towards improved training experiences to inspire future leaders in Parkinson's research. With this grant, we can thoroughly test our ideas and gather high-quality data on a faster timeline than would otherwise be possible. Essentially, the funding allows us to transform an innovative idea into a well-executed study. If our hypotheses prove true, the results from this project will form a foundation for larger studies and clinical trials in the near future, with the end goal of bringing these positive findings out of the research lab and into Parkinson's care.

Impact for the Community: If our research is successful, it could lead to a new therapy that helps those who suffer from orthostatic hypotension (dangerous blood pressure drops when standing). This could mean less dizziness and fewer fainting episodes when standing or walking. That improvement would translate to a lower risk of falls and injuries, allowing people to perform day-to-day activities with more confidence and independence. Better blood pressure stability can also reduce fatigue and brain fog that often accompany these drops, so patients might feel more alert and energetic, which may even invigorate more exercise and physical activity to compound health benefits. Overall, we hope for this new therapeutic approach to improve quality of life by allowing people to stay more active, social, and independent.

Dr. Austen Milnerwood

McGill University

Functional consequences of immune signalling on neurons and PD risk variants

Judi Richardson Pilot Project Grant - $75,000 over one year

Project Description: We have good treatments for many PD symptoms based on dopamine replacement, but none prevent or slow down the dopamine axon degeneration and eventual cell death that are believed to be important to disease progression. A major obstacle to providing a “disease modifying” or ‘neuroprotective” treatments is our lack of understanding what goes wrong in these cells before they start to die off. The highest PD risk is age, the second is genetic predisposition, and inflammation is a major contributor. Knowing how PD genes and inflammation combine to impair neuron function and survival might reveal how to prevent neurodegeneration. Hyperactive enzyme activity of one PD-linked protein, LRRK2, is thought to be important in familial and sporadic Parkinson’s disease. We have found this to be associated with altered dopamine function in PD genetic mice. We also found that inhibiting LRRK2 can undo some effects of the mutations, suggesting it could be very helpful for treating early PD. Recent research shows that LRRK2 is also activated by signaling through the immune system. We are studying how immune signaling controls neuron function, if LRRK2 is needed for these responses, and whether mutations in LRRK2 exaggerate the effects of immune signaling in the brain.

Importance of Funding: Transformative. This award will springboard a good idea, that is a little risky for most large grants.

Impact for the Community: By the time we complete the Pilot award, we will not only have trained a new scientist dedicated to PD research, but also produced the data we need to take these ideas forward over the next few years. I’d like our work to be instrumental in providing neuroprotection for PD. I would then have hoped to have started, if not finished, trying to do the same for other conditions which reduce the quality of life, and capacity to contribute as much as possible to society, in our increasingly ageing population.

Dr. Janelle Drouin-Ouellet

Université de Montréal

Investigating the impact of microglial aging on dopamine neurons

$75,000 over one year

Project Description: It is strongly suspected that inflammation is contributing to the loss of dopamine neurons, the type of neurons controlling voluntary movement that are loss in PD. We suspect that microglia, the main immune cell in the brain, plays a major role in driving this inflammation. However, what triggers this inflammatory state in microglia is currently unclear. We suspect that microglia in PD are prone to become senescent, a cell state occurring more often with aging, and associated with the production of toxic factors by the senescent cell. To address this, we will use cells collected in a non-invasive manner from people living with PD (skin cells and stem cells), and transform them to become senescent microglia and aged dopamine neurons. These unique PD models-in-a-dish have been recently developed in our lab. We will collect the molecules secreted by the senescent microglia and expose the dopamine neurons to them. We will then assess the damage to the dopamine neurons induced by these factors. Finally, we will block the inflammation signal in microglia using a drug and evaluate whether this prevents dopamine cell death. This project, by identifying specific brain inflammation mechanisms occurring in senescent microglia as a contributing factor to PD, would provide a strong rationale to investigate the use of senolytics (drugs eliminating senescent cells) as a therapy for PD.

Importance of Funding: This project is quite unique in the large number of patient-derived lines we will be using to address our scientific question. As such, collecting the necessary preliminary data to obtain a large-scale grant is very costly and would be incredibly challenging to achieve without the support of the pilot project grant program.

Impact for the Community: By identifying specific brain inflammation mechanisms occurring in senescent microglia as a contributing factor to PD this project would provide a strong rationale to investigate the use of senolytics (drugs eliminating senescent cells) as a therapy for PD. Aging has been identified as the most important risk factor for Parkinson's almost 30 years ago and yet, little is known about how cellular aging leads to Parkinson's. I would like to contribute to our understanding of what age-associated biological processes contribute to PD the most, and how anti-aging therapies targeting these specific pathways can be leveraged as therapy solutions.

Dr. Phillip Millar

University of Guelph

Unraveling the differences between Parkinson's disease related fatigue and performance fatigue

$74,549 over one year

Project Description: Regular aerobic exercise improves motor symptoms, mobility, and quality of life in people with Parkinson's disease (PD), yet fatigue remains a major barrier to physical activity. Fatigue in PD is difficult to measure and manage and can be divided into two distinct constructs: PD-related (perceived) fatigue and performance (objective) fatigue. Our pilot data show that these two measures are unrelated, suggesting an important opportunity to improve exercise prescription and adherence. This study will examine the relationship between perceived and performance fatigue in 40 adults with PD and 20 adults without PD over one year. We will assess fatigue, physical activity, sleep, anxiety, and depression to test whether perceived fatigue fluctuates with non-motor symptoms, is inversely related to physical activity, and remains independent of objective performance fatigue. By clarifying the mechanisms and consequences of PD-related fatigue, this work will provide a foundation for more effective exercise guidance and PD management. Ultimately, our findings aim to support greater participation in physical activity by helping people with PD distinguish between how fatigued they feel and what their bodies are capable of doing.

Importance of Funding: Simply put, this work would not proceed without their donation. Fatigue is such a critical element of one's quality of life, but we have little information on how to manage it and what triggers it. Several studies have shown that people with PD who are physically active have similar cardiorespiratory fitness and muscle strength, two major predictors of morbidity and mortality, as age- and sex-matched controls. Thus, how to deal with fatigue so that people with PD engage in regular physical activity is imperative with real-world rapid applications.

Impact for the Community: We believe that our results will help to improve quality of life by drawing attention to the fact that perceived fatigue (what we feel) does not equal what we can do (performance fatigue). This can help motivate some participants to get out and be more active.
We will also determine how anxiety, depression, and sleep interact with fatigue, helping to identify factors that can be better managed to reduce perceived fatigue. Our team hopes to make lasting contributions to the beneficial role of regular physical activity in people with PD. Viewing exercise as an effective way to manage symptoms and delay disease progression leading to an improved quality of life.

Dr. Sathya Karunananthan

University of Ottawa

Enhancing community-centred integrated care and equitable access to quality specialist care for people living with Parkinson's Disease through eConsult

$74,000 over one year

Project Description: Delayed diagnosis and limited access to specialist care remain major challenges for people living with Parkinson's (PwP), often due to gaps in early recognition and management by family physicians. Parkinson Canada's National Roundtable Report calls for targeted education and support to address these gaps. This project responds directly to that call by examining the use of eConsult, a secure platform that enables family physicians to seek timely advice from specialists.
Using data from the Champlain BASE eConsult service (2016–2024), we will analyze Parkinson-related consultations to characterize usage patterns, response times, costs, and educational value for family physicians. AI methods will be used to identify frequently asked clinical questions and common knowledge gaps. Findings will inform the development of targeted training resources and a "Most Commonly Asked Clinical Questions about Parkinson's" infographic to support more confident and timely Parkinson care in primary practice.

Importance of Funding: This funding opportunity will allow our research team to extend the evaluation of eConsult to patients living with Parkinson's. Findings will be important to inform the value of eConsult in Parkinson care and thus spread & scale its usage among PCPs in Ontario. This will potentially increase the number of eConsult cases related to Parkinson's and provide further opportunity to explore the use and value of eConsult for patients with Parkinson's in a larger scale. Methods and results of this pilot project are relevant and easily extended to other regions of Canada as eConsultation strategies are being implemented across Canada. Preliminary findings from this study will also support future tri-agency funding applications in this important topic.

Impact for the Community: We expect our findings to inform more timely access and better quality of care for patients with Parkinson's: 1) patterns of eConsult use and the physician-reported value of eConsult exchanges for Parkinson's care will provide insights into how eConsult can be leveraged to support PCPs in community-based care for patients with Parkinson's; 2) the identified knowledge gaps will inform continuing medical education interventions targeting Parkinson's-related care for PCPs ; 3) The pilot web based knowledge base will be queried by PCPs seeking answers to commonly asked clinical questions about Parkinson's and allow for ongoing development. My research goal is to improve equitable access to healthcare for populations who, based on various factors including their language, sex/gender, socioeconomic position, racialization and intersecting identities, remain underserved.

New Investigator Award

Dr. Camila Aquino

University of Calgary

Understanding Patient Preferences and Personalizing Device-Aided Therapies for Parkinson's Disease

$123,650 over 3 years

Dr. Pooja Gandhi

University of Alberta

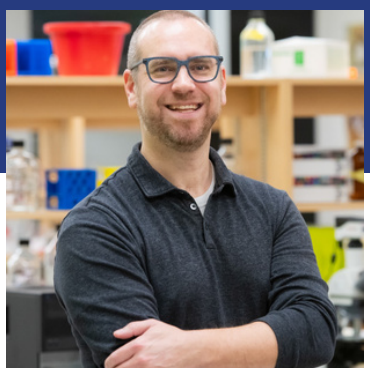
EFFORT-PD: Exploring the Efficacy of the Effortful Swallow Maneuver for Improving Swallowing in People with Parkinson Disease

Parkinson Society British Columbia

Funded in partnership with Parkinson Society British Columbia
- $134,110 over 3 years

Dr. Jay Penney

University of Prince Edward Island



Human neuron and microglia models to understand RAB32 mutations in Parkinson's disease

$135,000 over 3 years

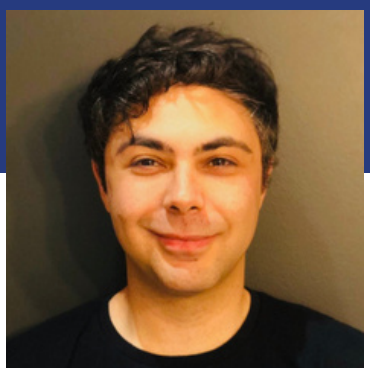
Project Description: This project will use human stem cell models to understand the effects of a newly identified Parkinson's disease-causing mutation on two key brain cell types – dopaminergic neurons and microglia. The progressive loss of dopaminergic neurons leads to the main symptoms of Parkinson's disease, while microglia are an innate immune cell type that has been increasingly appreciated to impact neuron health during neurodegeneration. The protein RAB32 is expressed in both dopaminergic neurons and microglia, while the RAB32 S71R/+ mutation was identified in 2024 as a cause of familial Parkinson's disease. Thus, we will test whether key cellular processes that are known to contribute to neurodegeneration are altered in control vs. RAB32-mutant dopaminergic neurons and/or microglia, as well examining RAB32 functions that are known from other cell types. We will also test whether microglia carrying RAB32 mutations can impact neuron health in co-cultures. Further, we will examine cellular signaling pathways that can be regulated by RAB32 in other cell types to determine whether they are affected by the RAB32 S71R/+ mutation in dopaminergic neurons and/or microglia, hopefully identifying targets for therapeutic intervention. Together, these experiments will provide significant insight into the cellular and molecular mechanisms that link RAB32 mutations to Parkinson's disease, with the potential to uncover novel, therapeutically relevant pathways and processes.

Importance of Funding: This New Investigator Award from Parkinson Canada is absolutely critical to allow this research project to happen. Without this award my lab simply would not be able to conduct the proposed studies, which will help to understand how RAB32 mutations affect key brain cell types and ultimately lead to the development of Parkinson's disease.

Impact for the Community: This is a basic research study that aims to understand how a newly identified Parkinson's disease-causing mutation alters the functioning of brain cells. The proposed studies will also test specific cellular signaling processes, attempting to identify underlying mechanisms that could potentially be targeted by therapeutics. While the findings from this project will not have a short-term impact on the lives of Canadians living with Parkinson's, a better understanding of the mechanisms by which RAB32 mutations cause disease, and the roles played by microglia, will push forward our understanding of disease pathophysiology. Furthermore, this project is also likely to identify dysfunctional cellular processes that could serve as the basis for longer term development of new treatments.

Dr. Shady Rahayel

Université de Montréal



Glymphatic Dysfunction as an Early Biomarker for Parkinson's Disease and Related Dementias

$135,000 over 3 years

Project Description: This project will investigate whether problems in the brain's waste-cleaning system, called the glymphatic system, help explain why some people with isolated REM sleep behavior disorder go on to develop Parkinson's disease or dementia with Lewy bodies. Isolated REM sleep behavior disorder is a sleep condition in which people lose the normal muscle paralysis that occurs during dreaming, causing them to talk, shout, punch, or kick in their sleep. Research has shown that people with this condition are at much higher risk of developing neurodegenerative diseases such as Parkinson's disease or dementia with Lewy bodies, but the reasons for this increased risk are not yet fully understood. In this study, we will measure glymphatic system health using advanced brain imaging and examine whether reduced glymphatic function is associated with a higher likelihood of developing Parkinson's disease or dementia with Lewy bodies. We will also explore how glymphatic dysfunction relates to brain shrinkage (atrophy) and inflammation, which are key features of neurodegeneration. This research aims to lay the groundwork for new strategies to slow or prevent disease in people at risk and to improve long-term brain health and quality of life.

Importance of Funding: As a junior principal investigator, launching a lab and building a research program requires not only passion and vision, but also critical early-stage funding to get things off the ground. I am deeply grateful to the donors who support early-career researchers like me as we take on the challenge of becoming the next generation of mentors and leaders in the field.
This funding will allow us to advance the specialized imaging work in our lab—research that would not be possible without the commitment and generosity of donors. Their support is essential to helping new laboratories establish themselves and push forward innovative research that can ultimately improve the lives of people affected by Parkinson's.

I**mpact for the Community**: Our project aims to identify a prodromal brain marker (an early biological sign in the brain) that can detect which people with isolated REM sleep behavior disorder are at high risk of developing Parkinson's disease or dementia. This is critical because it allows us to identify the disease in its earliest, pre-diagnostic stage, before major symptoms appear.
Why does this matter? When testing new medications or neuroprotective treatments, it is essential to focus on people who share similar, active disease mechanisms. Including individuals with different underlying causes creates heterogeneous study groups, which reduces the likelihood of detecting real treatment effects and risks wasting valuable time and resources.
By identifying a reliable early brain marker, this work has the potential to accelerate the development of treatments that slow or prevent the progression of Parkinson's disease and related dementias.

Graduate Student Award

Alex Tchung

Université de Montréal

Optimization of mitochondrial efficiency to rescue dopamine neurons in Parkinson's disease

Fonds de recherche Santé Québec

Funded in partnership with the Fonds de recherche du Quebec Sante - $55,000 over 2 years

Project Description: Parkinson's disease occurs when specific brain cells, called dopaminergic neurons, die, leading to movement problems such as tremors and stiffness. My research aims to understand why these neurons are so vulnerable and explore ways to protect them. The study focuses on mitochondria, the energy producers of cells, as their dysfunction appears to play a key role in neuron loss. By testing molecules that improve mitochondrial efficiency, we hope to reduce harmful oxidative stress and prevent neuron damage, ultimately paving the way for new treatments.

Importance of Funding: Thanks to your support, we can explore a completely new approach to protecting brain cells in Parkinson's disease. Instead of just treating symptoms, our work focuses on preventing neuron loss by improving how they produce energy. This funding allows us to test promising molecules, use state-of-the-art imaging tools, and develop a deeper understanding of what makes these neurons so vulnerable. Your generosity is fueling research that could lead to real breakthroughs for people living with Parkinson's.

I**mpact for the Community**: By the end of this study, we hope to identify new strategies for protecting neurons before they die. Our work focuses on neuroprotection, which means finding ways to slow or stop the disease's progression, rather than just managing symptoms. If successful, this research could pave the way for new treatments that keep neurons healthier for longer, potentially delaying the onset of severe symptoms and improving the quality of life for people with Parkinson's. In ten years, I envision myself leading a research program focused on translating fundamental discoveries into real-world treatments for neurodegenerative diseases. Whether in academia, biotech, or a startup, my goal is to push the boundaries of what's possible in Parkinson's research and contribute to the development of therapies that make a tangible difference. In addition to developing neuroprotective treatments, I would also love to explore ways to detect Parkinson's disease before symptoms appear, using biomarkers. Early detection is crucial because it would provide a much larger therapeutic window, allowing us to intervene before significant neuron loss occurs. This approach represents the best combination of my current work as a PhD student focused on mitochondrial function and neuroprotection and my long-term vision for the future: developing both early diagnostic tools and effective treatments to combat Parkinson's at its root. I also hope to mentor and inspire the next generation of researchers in this field, fostering innovation and collaboration to accelerate breakthroughs in neurodegenerative disease research.

Angie Milena Bustos Rangel

Université Laval

Therapeutic strategy for Parkinson's disease: Gene therapy via intravenous AAV vectors encoding FAB antibodies targeting alpha-synuclein

Funding generously provided by the Leacross Foundation - $40,000 over 2 years

Project Description: My project focuses on developing a new gene therapy treatment for Parkinson's disease. I am studying small antibody fragments, called Fab fragments, that can recognize and neutralize alpha-synuclein, a harmful protein that builds up in the brains of people with Parkinson's. Using specially engineered viruses, these antibody fragments are delivered through the bloodstream and into the brain. The goal of this approach is to reduce the damage caused by alpha-synuclein and improve overall brain health.

Importance of Funding: I would sincerely like to thank the donors for believing in new ideas and for supporting early-career researchers like me. This award gives me the opportunity to test a promising new treatment approach that could help lead to better options for people living with Parkinson's disease.

I**mpact for the Community**: I hope my research will contribute to the development of new treatments that can slow down or even stop the progression of Parkinson's disease. Rather than focusing only on managing symptoms, this approach aims to protect brain cells and reduce the harmful effects of alpha-synuclein. Over time, this could lead to a better quality of life and renewed hope for people living with Parkinson's. In ten years, I hope to be leading my own research group and continuing to work on therapies for neurodegenerative diseases like Parkinson's. I want to help train the next generation of scientists and keep pushing the boundaries of what is possible in brain health.

Ghislaine Deyab

McGill University

Parkinson's disease pathogenesis influences human microglia transcriptional identity and contributes to inflammatory responses in microglia containing midbrain organoids

$40,000 over 2 years

Project Description: Parkinson's disease is a neurodegenerative disorder that affects movement and cognition, but many of the mechanisms driving its progression are still not well understood. Growing evidence suggests that microglia, the brain's immune cells, play a key role in Parkinson's disease. Early in the disease, microglia may protect brain cells, but as the disease progresses they can become overactive and contribute to inflammation and cell death. To better understand this process, we use lab-grown human mini-brains derived from stem cells that include microglia. This physiologically relevant model allows us to study how microglia influence Parkinson's disease progression, how inflammation shapes their role, and which genes drive protective or harmful effects. This work could identify new therapeutic targets that are not detectable using traditional models.

Importance of Funding: I would like to thank the Parkinson Canada donors for funding the Graduate Student Award I received. This support has been essential in allowing my project to grow and explore new research directions that would not have been possible otherwise. Research using stem cell technology is highly promising but also resource-intensive, requiring significant time and investment to establish reliable models. Despite these challenges, this approach is critical for advancing our understanding of Parkinson's disease, as it allows us to study disease mechanisms using human- and patient-specific models without invasive procedures. Importantly, human-derived systems help overcome species differences that often limit the translation of findings to clinical trials.
This award has enabled me to continue pursuing this important work, and I am sincerely grateful for the donors' support.

Impact for the Community: I believe this research will contribute to the development and testing of new treatments for Parkinson's disease. By examining changes in gene expression in microglia from Parkinson's disease mini-brains, we aim to better understand how these cells contribute to inflammation and disease progression. This knowledge could help identify new targets for therapeutic intervention. Developing accurate, patient-specific models of microglial responses would also create a valuable platform for drug discovery, allowing potential treatments to be tested on human-derived models before reaching patients. In the short term, this work will deepen our understanding of microglial function in Parkinson's disease and identify promising therapeutic targets. In the long term, it could support pre-clinical testing of new treatments, helping bring more effective therapies closer to people living with Parkinson's disease and improving quality of life.

Houman Azizi

McGill University

Associations Between Genetics of Parkinson's Disease, Brain Structure, and Behavioral and Cellular Phenotypes

Funded in partnership with Fonds de recherche du Quebec Sante - $55,000 over 2 years

Project Description: Parkinson's disease (PD) is a common neurodegenerative disorder with symptoms that significantly affect quality of life. While the exact causes of PD are not fully understood, research shows it arises from a combination of genetic, environmental, and lifestyle factors. Recent genetic studies have identified many risk genes and allow researchers to estimate an individual's genetic risk for developing PD. However, how this genetic risk translates into vulnerability to the disease remains largely unknown. This project aims to examine how genetic risk for PD affects brain structure and how these changes relate to cellular processes, behavior, and disease development. Using data from 60,000 participants in the UK Biobank, we will integrate genetic, brain imaging, and behavioral data to identify early brain changes linked to PD risk. By bridging genetics, brain anatomy, and behavior, this research could improve early diagnosis, support prevention strategies, and contribute to the development of more effective treatments for Parkinson's disease.

Importance of Funding: Parkinson's disease (PD) is a common neurodegenerative disorder with symptoms that significantly affect quality of life. While the exact causes of PD are not fully understood, research shows it arises from a combination of genetic, environmental, and lifestyle factors. Recent genetic studies have identified many risk genes and allow researchers to estimate an individual's genetic risk for developing PD. However, how this genetic risk translates into vulnerability to the disease remains largely unknown. This project aims to examine how genetic risk for PD affects brain structure and how these changes relate to cellular processes, behavior, and disease development. Using data from 60,000 participants in the UK Biobank, we will integrate genetic, brain imaging, and behavioral data to identify early brain changes linked to PD risk. By bridging genetics, brain anatomy, and behavior, this research could improve early diagnosis, support prevention strategies, and contribute to the development of more effective treatments for Parkinson's disease.

Impact for the Community: A better understanding of how Parkinson's disease develops could lead to more effective treatments that target the underlying causes of the disease rather than just managing symptoms. Our findings could help physicians select the most appropriate treatments for each patient based on their individual genetic makeup, and may also suggest ways to identify, prevent, or delay the disease in people who are at higher risk. While this project does not directly develop new treatments, the knowledge gained could play an important role in shaping improved care options in the future and ultimately enhancing quality of life for people living with Parkinson's disease.

Olivia Crozier

Western Unviersity

Enhancing Self-Management and Health Program Service Delivery for Persons Living with Parkinson's Disease and Care Partners

Funding generously provided by the Leacross Foundation and in partnership with Mitacs and Parkinson Society Southwestern Ontario - $40,000 over 2 years

Project Description: Parkinson's disease affects not only the individual diagnosed, but also care partners, families, and health care providers. In Canada, over 100,000 people live with Parkinson's, yet access to coordinated, specialized care remains limited. Many face long wait times, difficulty accessing allied health services, and gaps in Parkinson's-specific training among providers.
This research focuses on improving support for people living with Parkinson's and their care partners, particularly between medical appointments. By evaluating and implementing self-management programs, the project aims to improve access to resources that help individuals manage daily symptoms and challenges. Ultimately, this work seeks to strengthen the coordination and sustainability of Parkinson's-related programs and services to better support people with Parkinson's and their care partners across community and clinical settings.

Importance of Funding: I am deeply grateful for the donors who funded this award. This opportunity will allow me to dedicate more time and focus to a project I am truly passionate about. This opportunity allows me to work closely with individuals living with Parkinson's disease, their care partners, and healthcare providers to ensure that the research is meaningful, relevant, and grounded in real-world needs. Their support not only helps advance a project that aims to improve care delivery and self-management for a growing and often underserved population, it also supports my ability to sustain myself financially during this critical stage of my training. Thanks to this funding, I can continue working in partnership with those directly impacted by Parkinson's disease and contribute to research that strives to make a difference in their lives.

I**mpact for the Community**: By the end of this project, I hope the research will support more coordinated, consistent, and sustainable care for people living with Parkinson's and their care partners. By identifying gaps and barriers in the current system, this work will help improve how care is delivered across community and clinical settings. Building on earlier findings that highlight a lack of inclusive self-management programs in Canada, this project will refine and implement a multidisciplinary program involving health care providers to better reflect the real-world needs of both individuals with Parkinson's and their care partners. Strengthening support for care partners can improve well-being, reduce caregiver burden, and help prevent the need for more intensive services. An implementation manual will support future delivery and scaling beyond Southwestern Ontario, contributing to better day-to-day management and improved quality of life for those affected by Parkinson's.

Raphaelle Denis

Université de Montréal

Development of axonal arborization and connectivity of dopamine neurons

$40,000 over 2 years

Project Description: Dopamine is an important chemical messenger in the brain. Dopamine neurons in the substantia nigra pars compacta (SNc) and ventral tegmental area (VTA) are involved in several important functions, such as movement control, motivation and memory. These neurons form numerous branches and establish a particularly high number of axonal terminals, i.e., sites of dopamine release, especially in SNc neurons. These properties impose very high energy demands on dopamine neurons, which could represent a major challenge for these cells. It is the dopamine neurons of the SNc that are most affected and degenerate in Parkinson's disease. At present, nothing is known about the mechanisms underlying these features, and a better understanding of them could lead to major advances in the treatment of Parkinson's disease. The main aim of my project is to better understand the development of the arborization of dopaminergic neurons and the mechanisms involved. Why are the dopaminergic neurons of the SNc so different from those of the VTA in terms of morphology, despite their anatomical proximity? This could help us understand why this population of neurons is so vulnerable, and how we might protect them from degenerating into disease.

Importance of Funding: Parkinson Canada's Graduate Student Award is a wonderful recognition of my efforts throughout my graduate studies, and I'm truly thankful for this distinction. This support from Parkinson Canada will allow me to fully commit to my training and research without financial stress.

I**mpact for the Community**: The objective of my project is to better understand the fundamental mechanisms of the development of vulnerable neurons in Parkinson's disease. We aim to better understand the causes of Parkinson's disease, share our advances with the scientific community, and collectively develop better long-term therapeutic strategies. This project will lay the foundations for translational research, which could have a significant impact on affected patients. In the long term, these discoveries could improve the quality of life of Canadians with Parkinson's disease by enabling earlier and better-adapted interventions. The different aspects of my project could contribute significantly to our understanding of the development of Parkinson's disease, and this is an important part of designing new therapeutic approaches. Ten years from now, I hope to have made a significant impact in the field of Parkinson's disease. I see myself taking on greater responsibilities and making a significant contribution to neurodegenerative disease research. I want to continue to develop my skills, take on new challenges and engage in work that is both impactful and fulfilling. I look forward to the various opportunities for interdisciplinary collaboration, which I believe are key to the advancement of research.

Regina Annirood

University Health Network

Transcranial Ultrasound Stimulation (TUS): Exploring the effects of 5Hz vs 10Hz TUS on different brain regions in Parkinsonian patients

Funding generously provided by the Leacross Foundation - $40,000 over 2 years

Project Description: Parkinson's disease (PD) is a neurological disorder that impairs movement and daily functioning due to abnormal brain activity in motor control regions. Deep brain stimulation (DBS) is a widely used treatment that can improve symptoms, but its invasive nature limits accessibility for many patients. Transcranial ultrasound stimulation (TUS) is a non-invasive alternative that uses targeted sound waves to modulate brain activity and may offer similar benefits without the need for surgery. My project will investigate the effects of two different TUS protocols on motor function in 15 PD patients on medication. The first protocol, 5 Hz TUS, is expected to enhance motor performance and movement control, while the second protocol, 10 Hz TUS, may help reduce impulsive movements. Participants will complete multiple sessions in which motor function will be assessed before and after stimulation using standardized movement tests, video recordings, and computer-based tasks.
If successful, this project will support the development of TUS as a viable non-invasive neuromodulation approach, potentially leading to larger clinical trials and future clinical applications for PD treatment.

Importance of Funding: This funding will support research on transcranial ultrasound stimulation (TUS) as a non-invasive treatment for Parkinson's disease (PD). In the short term, the study will provide data on the effects of 5 Hz and 10 Hz TUS protocols, helping determine their potential to improve motor and cognitive symptoms. These insights will lay the groundwork for larger trials, which could lead to longer-lasting effects and eventual regulatory approval. In the long term, TUS could offer a low-cost, outpatient treatment that reduces symptoms with fewer side effects and improves access for underserved populations. The research will contribute to ongoing efforts for Health Canada approval and further the development of TUS as a non-invasive alternative to deep brain stimulation (DBS) for PD.

Impact for the Community: The research findings have the potential to significantly improve the quality of life for individuals affected by Parkinson's disease (PD). The ability to offer a non-invasive, low-cost treatment like TUS could revolutionize PD care by providing a safer, more accessible alternative to deep brain stimulation (DBS). If successful, this research will contribute to improving motor control, reducing symptoms like tremors especially those in the earlier stages of the disease. Importantly, this project could lead to a personalized treatment approach, where patients benefit from a non-invasive neuromodulation technique tailored to their specific needs, offering a more effective and less invasive way to manage their condition.

Shan Sohail

University of Toronto

Reverse engineering the mechanisms of deep brain stimulation in Parkinson's disease

$40,000 over 2 years

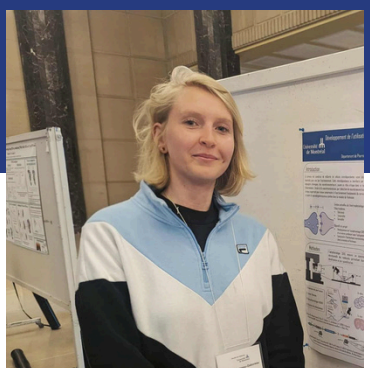
Project Description: Deep brain stimulation (DBS) is a widely used surgical technique to treat Parkinson's disease (PD). The standard approach involves implanting an electrode into the subthalamic nucleus (STN) and delivering continuous high-frequency stimulation, typically at 130 Hz. Despite its success, DBS has limitations, including transient therapeutic effects once stimulation stops and the potential for psychiatric side effects. These issues likely stem from an incomplete understanding of how STN-DBS engages neural circuits. Our previous work in PD patients suggests that activation of inhibitory circuits projecting to the STN may underlie the therapeutic effects of DBS. To investigate this mechanism, our current project will employ advanced optical techniques to both manipulate and record neural activity in a preclinical model. By integrating these tools with DBS, we aim to uncover how stimulation modulates specific brain pathways, ultimately guiding the development of optimized DBS protocols for clinical use.

Importance of Funding: If I had the opportunity to speak with the donors, I would explain that this grant directly enables the next step in our research. It allows us to purchase optrodes, which are unique tools that combine an optical fiber and an electrode into a single, very precise implant. These tools are essential for performing Opto-DBS, a technique that lets us activate specific brain circuits while recording from them at the same time. Without optrodes, we simply can't achieve the level of accuracy needed for this project. With them, we can perform more precise surgeries, collect cleaner data, and answer questions that were not technically possible before. Ultimately, this grant helps us move closer to improving DBS therapy for Parkinson's Patients.

Impact for the Community: By the end of this study, we hope our findings will directly contribute to improving the lives of people with Parkinson's disease by making deep brain stimulation (DBS) more precise, reliable, and effective. Our research is focused on understanding how DBS influences neural circuits in real time and identifying specific "hotspot" regions in the brain where stimulation produces the strongest therapeutic effects. We are also working to link these locations to electrophysiological biomarkers, which could eventually guide neurosurgeons to the optimal target during surgery. Because we are collaborating closely with neurosurgeons at Toronto Western Hospital, any insights we gain can be translated quickly into the operating room. This could lead to more optimized DBS treatments, more consistent symptom relief, fewer side effects, and improved quality of life for patients. Ultimately, our research contributes to the broader goal of using circuit-level understanding to refine and modernize DBS therapy for Parkinson's disease.

Soraya Paquereau-Gaboreau

Université de Montréal



Development of the use of Raman optophysiology to study neurotransmission in Parkinson's disease

$40,000 over 2 years

Project Description: Neurons communicate using chemical messengers called neurotransmitters, which are essential for functions such as movement and memory. In Parkinson's disease, this communication is disrupted, but current technologies have limited ability to measure multiple neurotransmitters in real time. This project aims to address this gap by developing SERS optophysiology, a novel approach that combines surface-enhanced Raman spectroscopy with optogenetics to simultaneously detect several key neurotransmitters, including dopamine, glutamate, GABA, and acetylcholine. After validating this technique in neuron cultures and brain slices, it will be applied to animal models of Parkinson's disease to study early neurochemical changes. By improving how we measure neurotransmission, this work could deepen our understanding of Parkinson's disease and help identify new therapeutic strategies to improve quality of life for patients.

Importance of Funding: This support has significantly strengthened my motivation to advance this project and expand its impact. The funding allows us to move beyond early proof-of-concept work and test SERS optophysiology in more advanced ex vivo and in vivo settings that better reflect the complexity of the living brain. With these resources, we can refine our technology, optimize detection of multiple neurotransmitters, and deepen our understanding of how neuronal communication is disrupted in Parkinson's disease. Ultimately, this support accelerates our progress and brings us closer to developing innovative tools that could improve future diagnosis and treatment strategies for Parkinson's.

I**mpact for the Community**: By the end of this project, our research aims to provide new insight into how neuronal communication is disrupted in Parkinson's disease. Through the development of SERS optophysiology, we hope to establish a highly sensitive method for detecting key neurotransmitters involved in the disorder. In the long term, this work could contribute to the identification of new biodynamics that improve early detection and diagnosis, an area where Parkinson's disease still faces major challenges. A deeper understanding of these signaling changes may help guide the development of more targeted and effective therapeutic strategies. Although our research is fundamental, it is closely connected to clinical collaborators and patient communities. This ensures that our scientific discoveries remain aligned with real patient needs and can eventually support improvements in quality of life, monitoring of disease progression, and personalized treatment approaches.
Ultimately, this project aims to strengthen the bridge between cutting-edge technology and meaningful clinical impact for people living with Parkinson's disease.

Post Doctoral Research Fellowship

Dr. Amandine Even

Université de Montréal

Involvement of the immune system in the vulnerability of neurons in Parkinson's disease

$90,000 over 2 years

Project Description: Parkinson's disease is increasingly understood as a multifactorial disorder driven by interactions between genetic susceptibility and environmental factors, including inflammation. Patients with PD exhibit elevated inflammatory responses, particularly in the brain, where glial cells adopt a pro-inflammatory state and T cells infiltrate affected regions. Pink1 and Parkin are key regulators of mitochondrial quality control, and loss-of-function mutations in either gene cause early-onset PD in humans. Although these mutations alone do not induce PD in mice, growing evidence suggests they sensitize the immune system to inflammatory stress, leading to heightened mitochondrial antigen presentation following infection. We hypothesize that this dysregulated immune response extends to the brain, where glial cells and dopaminergic neurons increase antigen presentation, promoting CD8+ T cell–mediated cytotoxicity and neuronal loss. This study will examine how loss of Pink1 or Parkin alters inflammatory responses in brain cells and will identify and test T cell–mediated mechanisms that could be therapeutically targeted.

Importance of Funding: Philanthropic support is essential to our scientific community. It allows us to bring new perspectives, deepen our knowledge of the disease, and ultimately make a significant contribution to improving the lives of those affected by the disease. By funding this project, donors will help to better understand the onset of the disease, and particularly whether it could result from a combination of genetic predisposition and infectious exposure. On a personal level, I am very grateful for this opportunity. This scholarship will help me finalize my postdoctoral project and thus allow me to advance in my career. It will also give me visibility among my peers and certainly allow me to initiate collaborations.

Impact for the Community: This study, utilizing in vitro mouse models, is expected to take 1 to 2 years to complete. The results will enhance our understanding of the mechanisms responsible for DA neuron degeneration, particularly concerning genetic mutations like Pink1 or Parkin. This research runs parallel to an adoptive transfer study of T cells in Pink1-KO mice, which I am also involved in. If results from both studies are promising, this could lead to validating the mechanisms in humans using fibroblast-derived cells from patients. This approach may help identify treatment pathways to inhibit neurodegeneration and contribute to early diagnosis and improved treatments for PD.

Dr. Anke van Roy

McGill University

The Effect of Different Types of Exercise on Sleep Quality and Architecture in Parkinson Disease: A Single-Blinded Randomized Clinical Trial

$90,000 over 2 years

Project Description: Sleep disorders affect most people with Parkinson's disease and can worsen symptoms and quality of life. Exercise is a promising, low-cost strategy to improve sleep in PD, but it remains unclear which types of exercise are most effective. This project will compare the effects of aerobic, strength, and combined (multimodal) exercise on sleep in people with PD, and examine whether sleep improvements are associated with benefits in cognition, movement, fatigue, well-being, and quality of life. We will recruit 150 individuals with mild-to-moderate PD and sleep problems to complete a 12-week exercise program or a no-training control condition. Sleep, brain activity, and clinical outcomes will be assessed before, immediately after, and 8 weeks following training. We hypothesize that multimodal exercise will produce the greatest improvements in sleep and related PD symptoms.

Importance of Funding: This fellowship provides me with the protected time and resources to run a large clinical trial that has a lot of moving pieces that need to be coordinated properly. This opportunity accelerates our ability to generate evidence-based information that could improve rehabilitation practices for patients with Parkinson's Disease. It also enables me to mentor graduate and undergraduate students and contribute to their development as clinical researchers. Ultimately, the financial support that is provided by the donors facilitated these substantial contributions to the movement disorder community and research field.

Impact for the Community: People with Parkinson's disease have identified improving sleep as a key research priority. Identifying the most effective types of exercise to improve sleep will support the development of more personalized, patient-oriented rehabilitation strategies and may improve treatment effectiveness. Understanding the links between exercise, sleep, and other PD symptoms may also inform new ways to evaluate treatment outcomes. To ensure direct clinical impact, our team will share findings through presentations at PD clinics and provide participants with individualized educational handbooks outlining their results, sleep tips, and exercise guidelines. A generalized version of the handbook will be made available online and through community centers, alongside workshops focused on sleep awareness and exercise. Through these efforts, we aim to translate research findings into practical, low-cost strategies that patients with PD can use in everyday life.

Dr. Miguel Angel Perez Castro

University of Toronto

Creating a model with targeted genetic manipulation of dopaminergic neurons to uncover potential treatment targets through in vivo CRISPR screenings

Funded in partnership with Parkinson Society British Columbia - $90,000 over 2 years

Project Description: Parkinson's disease is a brain disorder that affects movement and thinking, caused by the gradual loss of dopaminergic neurons in a small brain region called the substantia nigra. Why these neurons die, and when the disease begins, remains unclear, making PD difficult to diagnose and treat. In this project, I aim to identify new genes involved in PD progression using an in vivo CRISPR gene-editing approach. I have developed a mouse model that allows many different genes to be tested simultaneously for their effects on dopaminergic neuron survival. By delivering CRISPR components and Parkinson's-like disease triggers directly to the brain, each affected neuron will have a different gene switched off. Tracking neuron survival over time will reveal which genes protect neurons and which contribute to their loss. This work aims to identify new therapeutic targets and support earlier diagnosis of Parkinson's disease.

Importance of Funding: If any of the donors are reading these words, I would first like to sincerely thank you for financially supporting the Parkinson Canada Foundation and, secondly, for supporting this specific research project. You can be sure that my motivation is the highest, and I will do my very best to carry out this project successfully. Science can sometimes be slow or unpredictable, that's true, but with this project, you have invested in a powerful and innovative approach with great potential. I am truly grateful for your support, which makes this research possible.

Impact for the Community: This project uses in vivo CRISPR screening in the substantia nigra of mouse models of Parkinson's disease to identify genes that could serve as future therapeutic targets. A key outcome is the development of a novel experimental model that enables, for the first time, targeted genetic manipulation of dopaminergic neurons in this brain region. Using this platform, we aim to identify genes that may act as early biomarkers, neuroprotective factors, or treatment targets. Even if no single gene emerges as a clear candidate, the model itself will provide a valuable foundation for future studies, advancing CRISPR screening approaches in neuroscience and opening new avenues for Parkinson's research with long-term potential to improve quality of life.

Dr. Ryan Langridge

University of Manitoba

Multiple Systems Atrophy: Testing the association between brain glucose metabolism, dopamine transporter availability, and patient outcomes

Funded in partnership with Research Manitoba - $90,000 over 2 years

Project Description: The goal of this study is to characterize patterns of brain-glucose metabolism and dopamine transporter availability in individuals diagnosed with Multiple System Atrophy (MSA), a progressive, adult-onset neurodegenerative disorder classified as an atypical Parkinsonian syndrome. By identifying these neuroimaging-based biomarkers, I aim to clarify the biological mechanisms underlying the different subtypes of MSA and their associated symptomology. This knowledge will enhance our ability to distinguish the different subtypes of MSA, and benefit the differential diagnosis of other neurodegenerative disorders, such as Parkinson's disease. Ultimately, this research will support the development of more precise, subtype-specific treatment strategies tailored to patients' individual clinical presentations.

Importance of Funding: I would like to express my gratitude for the generous funding and the commitment to supporting this area of research. This project is an important step toward better understanding neurodegenerative disorders, and the funding I have received as a part of this reward is crucial for my success during my fellowship.

Impact for the Community: I believe the findings from this study will offer critical insights into how distinct patterns of brain activity are linked to specific clinical outcomes in MSA. By identifying the neurological biomarkers associated with different presentations of MSA and its subtypes, this research will deepen our understanding of the disease's underlying mechanisms. Ultimately, these discoveries can pave the way for more precise, patient-specific treatments that are tailored to both the neurological and clinical characteristics of the condition.

Dr. Sara Touj

McGill University

Preclinical Investigation of the p75 Neurotrophin Receptor Modulator LM11A-31 as a Potential Treatment for Synucleinopathies

$90,000 over 2 years

Project Description: My project focuses on testing a promising drug that may protect the brain in Parkinson's disease. This drug, called LM11A-31, has already been tested in people with Alzheimer's disease. In my study, I will use a mouse model of Parkinson's to see if the drug can slow down or prevent the spread of a harmful protein called alpha-synuclein, which builds up in the brain and causes damage. I will look at the brain with advanced imaging and behavior tests to see if the drug works, and whether it helps keep the brain healthy and functioning longer.

Importance of Funding: Thanks to your support, I now have the resources and time to explore a drug that could truly change the way we treat Parkinson's. This award allows me to run detailed experiments that wouldn't be possible otherwise, using advanced tools to see how the disease progresses and whether the drug is making a difference. Your generosity is helping us move one step closer to better treatments—and hopefully, one day, a cure.

Impact for the Community: I hope my work will show that LM11A-31 can protect the brain from damage caused by Parkinson's, especially in the early stages. If successful, this could lead to a new treatment that slows disease progression and helps people maintain their memory, movement, and independence for longer. It could also help identify brain markers that show whether a treatment is working, making it easier to test new drugs in the future.

Clinical Movement Disorders Fellowship

Dr. Matthiew Robitaille

Centre Hospitalier Universitaire Vandois de Lausanne

Clinical Movement Disorders Fellowship

$75,000 over 1 year

What led you to where you are now? From the early stages of my medical training, I was captivated by the complexity of the nervous system. However, it was during my neurology residency that I became particularly drawn to movement disorders. I was struck by how deeply these conditions impact patients' lives and how neurologists can significantly improve their quality of life through a combination of medical, surgical, and rehabilitative approaches. Working in a healthcare system where specialized movement disorder care is limited reinforced my determination to acquire advanced expertise in this field. Additionally, my involvement in clinical research and mentorship from inspiring leaders in the field further fueled my passion. I was particularly influenced by experiences in deep brain stimulation (DBS) and emerging neuromodulation techniques, which highlighted the potential for innovative therapies to transform patient care.

Importance of Funding: I would like to express my deep gratitude for this support, emphasizing how this opportunity is truly transformative for my career. Thanks to this fellowship, I will gain expertise in advanced movement disorder treatments, particularly deep brain stimulation and neuromodulation, which are essential for improving care for patients with Parkinson's disease and related conditions. Moreover, this training will not only benefit me but also my patients and the broader medical community. By bringing back this knowledge to Québec, I hope to enhance patient care, train future specialists, and contribute to research that could shape the future of movement disorder treatments. Their generosity is not just supporting my professional growth—it is directly impacting the lives of many patients.

What skillsets are you most excited to learn/further Develop? I am particularly excited to refine my expertise in deep brain stimulation (DBS), from patient selection and programming to intraoperative decision-making. Gaining hands-on experience with other neuromodulation techniques will also be invaluable as these therapies continue to evolve. Additionally, I look forward to deepening my research skills, particularly in translational and clinical research, to contribute meaningfully to advancing movement disorder treatments. Finally, working in a highly specialized multidisciplinary team will further enhance my ability to collaborate effectively with neurosurgeons, rehabilitation specialists, and allied health professionals, ensuring a comprehensive approach to patient care.

Dr. Parichehr Moghaddam

University of British Columbia

Clinical Movement Disorders Fellowship

Parkinson Society British Columbia

Funded in partnership with Parkinson Society of British Columbia - $75,000 over 1 year

What led you to where you are now? During my neurology training, I worked with many patients who had Parkinson's disease, and I saw how much their lives could improve with the right care. That really stayed with me. I became more and more interested in movement disorders because they're complex and affect people's independence and daily life in such a big way. Over time, I knew I wanted to focus on this area and learn more so I could help patients better.

Importance of Funding: This support means so much — it's allowing me to train at one of the best centres in Canada without worrying about how I'll manage financially. Especially with the high cost of living in Vancouver, this funding has made a big difference. Without it, it would have been extremely hard for me to focus on my training. Because of their generosity, I get to work with experienced doctors and patients every day, and I'm learning so much. This fellowship is giving me the chance to grow as a specialist and to continue my career in Canada, helping people living with Parkinson's disease.

What skillsets are you most excited to learn/further Develop? I'm most excited to get more hands-on experience with device-assisted therapies. I'm also learning how to manage both motor and non-motor symptoms, which can have a big impact on patients' quality of life. These are the kinds of skills I need to fully support my patients, and I'm really looking forward to developing them further.

Dr. Stanley Li

University Health Network

Clinical Movement Disorders Fellowship

$75,000 over 1 year