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2019-2020 Talent Development Competition Awardees

Discovery Fund Postdoctoral Fellowship Awardees

Patrick Jachyra

Supervisor: Meng-Chuan Lai

Title of Project: Suicidality among youth with autism spectrum disorder

Abstract: Adults with autism spectrum disorder (ASD) die by suicide, and think about killing themselves at horrifying rates. As such, adults with ASD are 7-9 times more likely to die by suicide, and contemplate suicide 10 times more often than adults in the general population. Despite increasing knowledge/research among adults, little is known about suicide and suicidality among youth with ASD as their voices have been excluded from researchThere is a pressing need to understand their perspectives and examine the factors that influence suicide as it is unknown how to support suicidal youth with ASD, provide adequate care, or best ways to prevent/reduce suicide in this population.. The purpose of this study is to: 1) Explore the perspectives, perceptions and coping experiences of suicidality among youth with ASD using qualitative methodology. Informed by these findings, a survey will be developed with study participants and implemented to 2) Understand the contributing and protective factors for suicidality. Working in partnership with youth with ASD, findings will contribute new and original knowledge regarding healthcare experiences, along with the risk, protection and resilience factors for suicide. This knowledge will be used to inform health policy seeking to reduce/prevent suicide, and facilitate access to mental health care. Finally, study findings will also inform education and training efforts for caregivers, clinicians, educators, and policy makers given the current lack of suicide/suicidality awareness, and lack of mental health promotion among youth with ASD.

Hali Kil

Supervisor: Brendan Andrade

Project Title: Associations between Trait Mindfulness, Maladaptive Parenting Cognitions, Stress, and Suicide Risk in Parents of Children with Emotional and Behavioural Disorders

Abstract: Parents receiving clinical services for their children with mental illness, such as emotional and behavioural disorders (EBD), experience heightened stress and are up to 3 times more likely to die by suicide compared to parents of healthy children. Understanding what contributes to elevated stress in these parents may ultimately reduce their risk of suicide. Two factors have been independently linked to stress: maladaptive parenting cognitions, the rigid thinking patterns that children's EBD are caused by internal and stable child aspects; and low trait mindfulness, the open, nonjudgmental awareness of the present moment. However, the association between these two important variables, and how they predict parental stress and suicide risk, is unknown. Understanding these associations is important because maladaptive parenting cognitions may explain the link between low trait mindfulness and elevated stress. The study will involve collecting data from 60 parents from the Child Youth and Emerging Adult Program (CYEAP) receiving treatment because of their children's EBD. The data will be tested for associations between parent's trait mindfulness, cognitions, stress and suicide risk and a model in which maladaptive parental cognitions explain the link between their trait mindfulness, stress and suicide ideation. Better understanding the associations between these variables may highlight aspects of parental mindfulness and cognition that are associated with stress and suicide risk to inform prevention and intervention approaches for children with EBD and their parents.

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Emiko Koyama

Supervisor: Clement Zai

Project Title: Multigenic risk score for childhood impulsive aggression, adverse childhood experiences and youth suicide intention and attempts: An exploration of biological mechanisms and predictors of treatment response

Abstract: Suicide is the leading cause of death among youth (10-19 year olds) in Canada and worldwide. Youth is a crucial developmental period for suicide prevention because rates of suicide ideation drastically increase during adolescence and people who attempt suicide will typically do so within the first year of suicidal ideation. Youth suicide intervention also needs to consider the unique needs of the youth, for example, the importance of parent-child conflict as a trigger for suicidal ideation and attempts (SIA) and impulsive aggression as a behavior trait strongly associated with youth SIA. Given the importance of impulsive aggression in youth SIA, the current research examines how the genetics of impulsive aggression may explain part of the reason why some youth consider or attempt suicide while others do not. It also tests the hypothesis that a psychosocial intervention aimed at reducing impulsive aggression through an integration of cognitive behaviour therapy for children and parenting skills training for caretakers will help reduce youth SIA. The sample consists of 514 youth (aged 6-17) with pervasive impulsive aggression and 287 controls. A genetic risk score for impulsive aggression will be created by taking the top hit genes in the serotonin, dopamine, and HPA-axis (Koyama et al., 2017). There were also 150 youth among the impulsive aggression group who received psychosocial intervention for their disruptive behaviours. Measures on impulsive aggression, suicide ideation and attempts were taken at pretest, post-test and 6 month follow-up. Regression analysis was used to examine whether suicide ideation and attempts were associated with genes implicated in impulsive aggression. The effect of psychosocial interventions on impulsive aggression and SIA was also examined using multivariate repeated measures ANOVA. If successful, the results will have significant implications for understanding the biological mechanisms and appropriate treatment for youth SIA.

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Karen (Thao Lan) Le

Supervisor: Christine Wickens

Title of Project: Attachment theory-based e-intervention for smoking cessation

Abstract: Smoking remains the leading cause of preventable death, constituting a major contributor to disease (i.e., lung cancer, heart disease) and disability. Developing more effective interventions for smoking cessation would decrease the disability associated with tobacco use. This requires understanding the determinants of smoking. Attachment theory is a well-established interpersonal theory that describes close relationships and their important links to behaviour, but is not commonly applied to substance use. Consistent with this theory, we have discovered that a photo of an attachment figure (typically a romantic partner) reduces craving for tobacco. This finding demonstrates that Attachment Theory can provide important new insights for novel and personalized treatment approaches to reduce smoking. Based on our initial findings, we have developed an attachment theory-based e-intervention, Stop Tobacco Program, STOP, for smoking cessation. During the course of Discovery Fund fellowship, I will study the impact of STOP. Participants' mean craving and smoking will be tracked over 3 months. In addition, I will conduct interviews with participants in order to study and evaluate end user experience and consumer engagement with the app. This feedback will be incorporated into the refinement of STOP 2.0. Postdoctoral support will enable me to assess a novel approach for more personalized strategies for smoking reduction and cessation that may result in more effective cessation strategies using broadly available tools.

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Amy Miles

Supervisor: Yuliya Nikolova

Project Title: Development and validation of a novel transcriptome-based polygenic risk score for depression

Abstract: Major depressive disorder (MDD) is a common and debilitating psychiatric illness that is moderately heritable. Although its societal cost is staggering worldwide, MDD is the leading cause of years lost due to disability – the biological basis of MDD is poorly understood, and efforts to identify genes associated with risk for MDD have lagged behind those for other disorders. Our group has developed a novel genetic risk score for depression (T-PRS) that uses genetic information obtained from a blood test to approximate expression of certain genes in the brain. This risk score focuses on genes that were consistently over-expressed or under-expressed in brain tissue collected from deceased individuals with MDD, as compared to deceased individuals without MDD, and higher scores indicate a more 'depression-like' gene expression profile. We recently identified associations between T-PRS and a male-specific risk pathway associated with blunted reactivity to faces. However, this association was identified using task-based fMRI, which is highly state-dependent and not always clinically feasible. Therefore, in the proposed study, we aim to extend this work by modeling effects of T-PRS on more stable and clinically applicable (f)MRI measures. Specifically, we aim to assess relationships between T-PRS and (i) resting-state connectivity in functional brain networks and (ii) structural characteristics of associated brain regions in healthy young adults participating in the Human Connectome Project (n=1142, aged 22–35 years). We also aim to test associations among T-PRS, brain morphology and connectivity, and self-reported depressive symptoms in order to investigate links between genetics, biology, and behavior. If validated, T-PRS could serve as an easily accessible biomarker of risk for MDD, and it could inform prevention efforts crucial for reducing disease-related disability.

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Discovery Fund Graduate Studentship Awardees

Kenya Costa-Dookham

Supervisor: Margaret Hahn

Project Title: Investigating the gut microbiome in relation to metabolic and cognitive dysfunction in first episode psychosis patients

Abstract: Antipsychotic (AP) medications are the cornerstone of treatment for many mental illnesses. Unfortunately, they are associated with significant weight gain and obesity related conditions, such as type 2 diabetes. In addition, these obesity related conditions have negative impacts on brain structure and function (i.e. "cognition"). Patients most vulnerable to these metabolic adverse effects are those in the early stage of their mental illness with no prior exposure to APs. Recent evidence suggests that the bacteria found in the digestive tract may help to explain the weight gain and cognitive dysfunction in patients with mental illnesses starting APs. This study is the first investigation of gut bacteria and AP-induced changes that cause metabolic side effects, also in relation to cognitive functioning, in patients beginning treatment. I predict: 1) Patients with mental illnesses will have less "good" bacteria than individuals without mental illnesses, 2) AP-treatment will change gut bacteria to an obese profile, 3) AP-changes will reflect AP-metabolic side-effects, 4) Gut bacterial composition and diversity will differ between patients who do and do not develop obesity-related side effects, and 5) Dysfunctional metabolic changes in the gut microbiome will be associated with worse brain functioning (cognition). Patients with severe mental illness (n= 25) and healthy controls (n=25) will be matched for age, sex, body mass index, and socioeconomic status. At the start, participants will undergo a detailed medical history examination, body measurements, assessment of brain function and psychiatric symptoms, bloodwork to examine metabolic health, and stool sample collection to characterize gut bacteria. These procedures will be repeated at the halfway point and end (12 weeks) of the study. This study may unravel the role of gut bacteria in mental illness and AP response, thereby setting the stage for new screening measures and treatment strategies.

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Hajer Nakua

Supervisor: Stephanie Ameis

Project Title: Identifying the Relationship between Cortico-amygdalar networks and behavioural dysregulation in children with Autism Spectrum Disorder

Abstract: Diagnoses of autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD) and obsessive-compulsive disorder (OCD) affect 7-14% of children across North America. Behavioural dysregulation, specifically externalizing behaviours (e.g. aggressive, noncompliant, oppositional) are common among children with these disorders and result in increased impairment, which represent one of the leading reasons for psychiatric referral. However, treatment options are limited to children with ASD and they are often treated with pharmaceuticals that are associated with significant adverse effects. To improve the treatment of externalizing behaviours in children with ASD and across varying neurodevelopmental disorders, more research is required to determine the brain regions associated with these behaviours. My supervisor has shown a relationship between externalizing behaviour and brain regions associated with emotional regulation in healthy children. Expanding from these findings, this project proposes to explore whether those brain regions may be associated with externalizing behaviours across children with ASD, ADHD and OCD. Our study will use data from the Province of Ontario Neurodevelopmental Disorder (POND) Network, including brain imaging and measures of externalizing behaviour in children with ASD, ADHD and OCD. If the same brain regions are associated with externalizing behaviours (in a similar pattern) across children with ASD, ADHD, and OCD, our results can provide the basis to advocate for increased access to mental health treatment for children with ASD. Thus, this project aims to provide a biological rationale to include children with a primary diagnosis of ASD into mental health services to treat behavioural problems, which they are often excluded from.

Top ups will also be received by:

Iska Moxon-Emre

Malvina Skorska

Alexia Polillo

Fumihiko Ueno