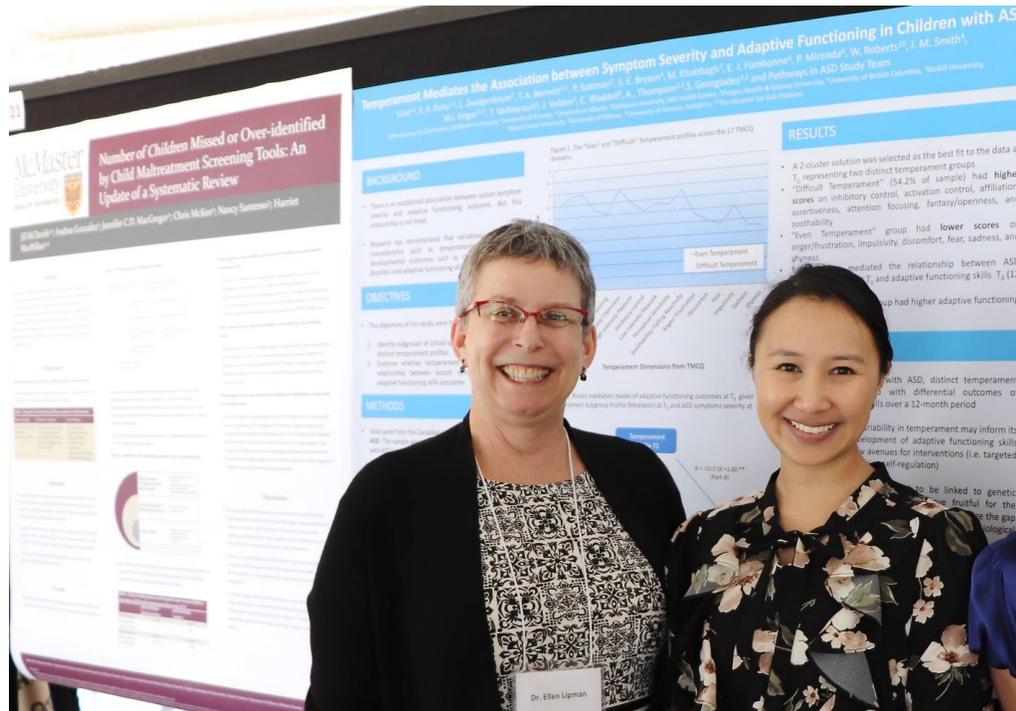


A magnifying glass icon with a grey handle and frame, positioned over the word "SPOTLIGHT".

# SPOTLIGHT ON RESEARCH

**Research Day Top 3 Posters: Postdoctoral Fellow Category**



**1<sup>st</sup> Place**

**Name:** Vivian Lee

**Supervisors:** Dr. Teresa Bennett and Dr. Ellen Lipman

**Education Program and Level:** Developmental Psychology Ph.D., Postdoctoral Fellow

**About Vivian:**

I am currently a Brain Canada-Kids Brain Health Network Postdoctoral Fellow working with Drs. Ellen Lipman and Teresa Bennett. I work with the [“Making the Race Fair / Family Check-up”](#) study, the [Pathways in ASD team](#), and am an active member of [McMaster Autism Research Team](#) (MacART). My research includes collaborating with members of the Ron Joyce Autism Spectrum Disorder Clinic and Child and Youth Mental Health Program teams to lead the first acceptability study of the Family Check-up program for families and children with diagnosed with Autism Spectrum Disorder (ASD) and who have emotional behavioral challenges. Additionally, I also have interests in investigating the individual, parental, and contextual characteristics and correlates to participation in sports and recreational activities in school-aged children with ASD.

I hope to continue building a rich and meaningful ASD family-centered research program within academia as a faculty member, as well as mentoring undergraduate and graduate students through courses and lab projects.

## **Vivian's Project:**

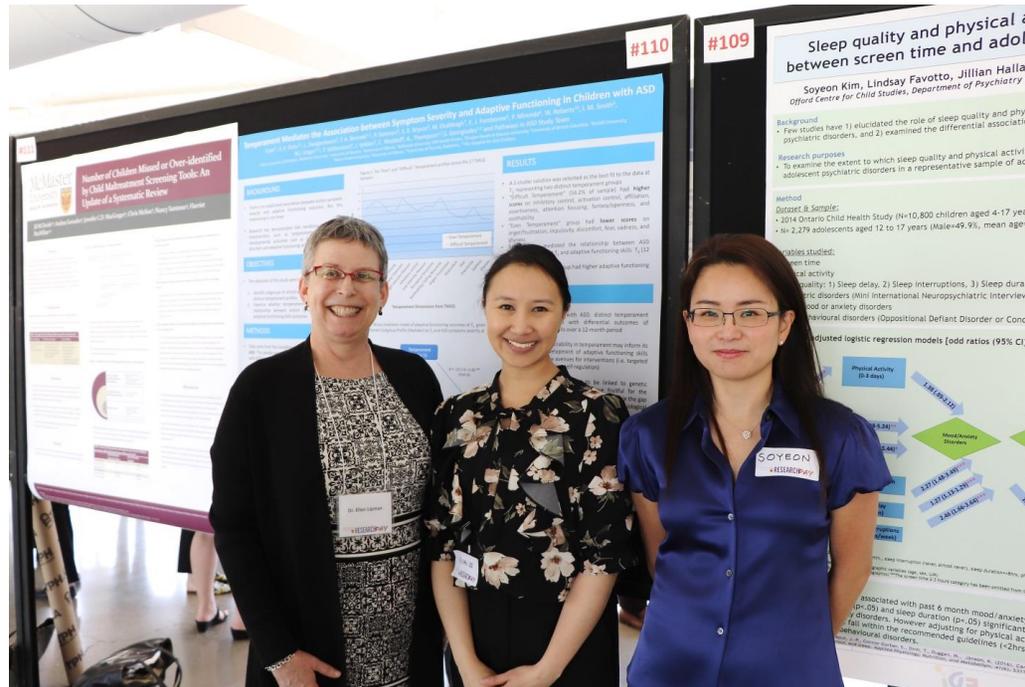
In recent years, research established a vast diversity *within* and *between* children diagnosed with autism spectrum disorders (ASD), their symptomology, and developmental outcomes. Previous research found a relationship between the number of autism symptoms and adaptive functioning skills (i.e. daily living skills, communication, friendships). For example, children who had more symptoms tended to have poorer adaptive functioning outcomes. However, this relationship was not consistent as some children who exhibited many ASD symptoms had also developed above average adaptive functioning skills. This led our research group to investigate other individual level characteristics that might be playing a role in influencing the relationship between the number of ASD symptoms and adaptive functioning skills.

One characteristic to consider was temperament. Temperament is defined as individual differences in behavioural tendencies that are shaped by genetics and the environment. It plays a role in emotion regulation, attention, and how an individual responds to their own environment. Importantly, research has also demonstrated that temperament can influence the developmental outcomes including adaptive functioning skills. Studies on temperament and children with ASD revealed that they had a unique temperament profile such that they typically had lower emotion regulation, attention control, and high reactivity in response to their environment when compared to neurotypical children. But no study had previously investigated the diversity of temperament within a group of children with ASD.

Therefore, this research project has two main goals. First, we wanted to examine the diversity of temperament within a Canadian sample of school-aged children diagnosed with ASD. Second, we aimed to investigate whether temperament profiles explained the inconsistencies in the relationship between high ASD symptoms and adaptive functioning outcomes.

Using a statistical technique called “clustering” or grouping children in terms of their unique temperament characteristic, our results revealed that our sample had two separate “clusters”. In the first cluster, children tended to have a more “even temperament” as characterized by having lower scores on frequent aggression, impulsivity, discomfort, fear, and sadness. The second cluster of children tended to have a “difficult temperament”, with parents characterizing them as being harder to sooth when upset, being more hyperactive and aggressive. Further, using a mediation modelling technique we found that temperament profiles did explain the relationship between ASD symptoms and adaptive functioning skills. For example, children with more ASD symptoms but who also had a more “even temperament” tended to have higher adaptive functioning skills compared to children with a “difficult temperament”.

These findings are the first to demonstrate that there are within group differences in temperament profiles within school-aged children with ASD. Second, these findings have important implications on how we develop individualized interventions for children with ASD. For example, interventions can target specific aspects of individual temperament characteristics (i.e. hyperactivity or emotion control) that might lead to better outcomes. This study is a good first step in understanding the diversity and unique needs of children diagnosed with ASD, but there is more work to be done to ensure the highest quality of care for this population.



**2<sup>nd</sup> Place**

**Name:** Soyeon Kim

**Supervisors:** Kathy Georgiades and Michael Boyle

**Education Program and Level:** Post-doctoral Fellow

**About Soyeon:**

I am interested in investigating the social-contextual factors contributing to mental health problems among adolescents. My research interest includes the prevalence and mental health-related impacts of cyberbullying in adolescents (two published, one accepted). I am currently expanding my research foci to study contemporary socialization processes affecting children and adolescents (e.g. use of social media, online games, and texting) and their implications on adolescent mental health using 2014 [Ontario Child Health Study](#). I was recently awarded the E.B. Eastburn Post-Doctoral Fellowship Award, which has allowed me to continue to enhance and strengthen my post-doctoral training and research at the Department of Psychiatry and Behavioural Neurosciences, McMaster University.

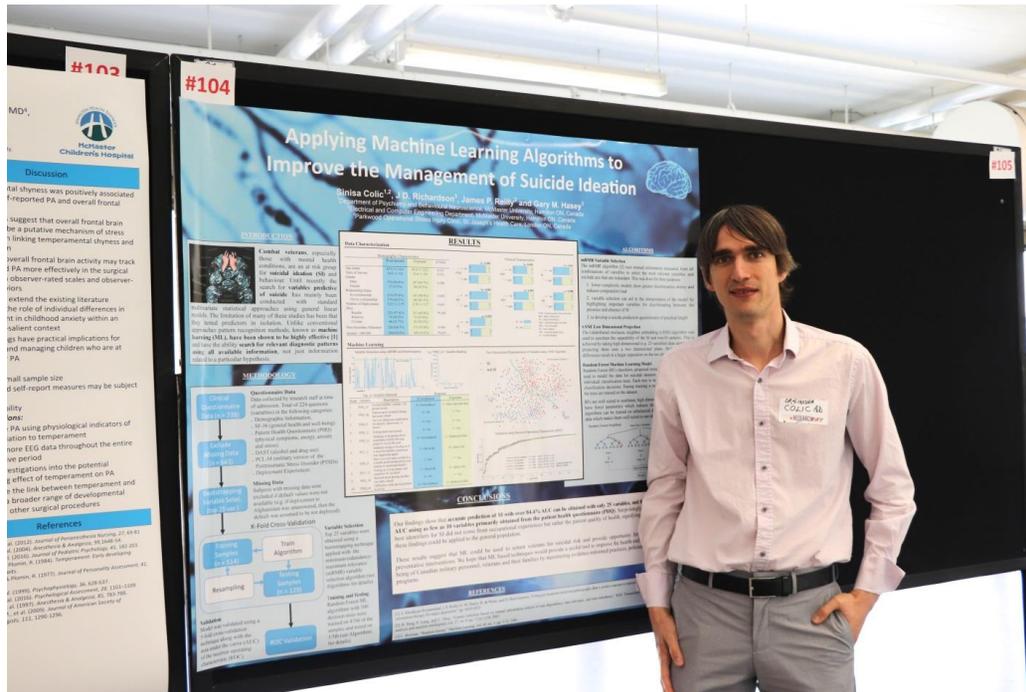
**Soyeon’s Project:**

In the last decade, there has been a sharp increase in the use of electronic devices among adolescents. The use of electronic devices and high amounts of screen time have been linked to elevated levels of mental health problems among adolescents. Despite these established association between screen time and mental health problems, few studies have attempted to elucidate factors that could significantly influence the observed links between screen time and mental health problems among youth. The current study examines the extent to which sleep quality

(sleep delay, interruption and duration) and physical activity account for the association between screen time and adolescent mental disorder in a representative sample of adolescents in Ontario.

Data come from the 2014 Ontario Child Health Study a cross-sectional survey of 10,800 children aged 4-17 years in Ontario. The sample for analyses in the present study includes 3,808 adolescents aged 12 to 17 years (Male=49.9%, mean age=14.43). Adolescent mental disorder was determined through the Mini international neuropsychiatric interview (MINI) Kid. Binary logistic regression models were conducted to estimate the strength of association between screen time and past 6 month mood and anxiety disorders, and behavioral disorders (conduct and oppositional defiant disorders) and the extent to which sleep quality and physical activity accounts for this association.

Preliminary results indicate that even after adjusting for physical activity, sleep quality and demographic variables, screen time significantly increased the odds of adolescents meeting the criteria of adolescent mood/anxiety disorders. In addition to screen time, sleep quality and physical activity were also significantly associated with adolescent mood/anxiety disorders. However, screen time did not significantly increase the odds of meeting the criteria of behavioral disorders in adolescents. The cross-sectional design renders it impossible to demonstrate the temporal relationship between predictors and the outcome. A longitudinal study is warranted to fully elucidate the role of sleep quality and physical activity in the association between screen time and adolescent mental health.



**3<sup>rd</sup> Place**

**Name:** Sinisa Colic

**Supervisors:** Drs. Gary Hasey and Jim Reilly

**Education Program and Level:** PhD in Electrical and Computer Engineering, Postdoctoral Fellow in the Department of Psychiatry and Behavioural Neurosciences

**About Sinisa:**

I am currently a Postdoctoral Fellow at the Department of Psychiatry and Behavioural Neurosciences. I received my PhD from the Department of Electrical and Computer Engineering, University of Toronto in 2017 on the topic of Machine Learning for Prediction of Anticonvulsive Drug Treatment Outcomes in Mecp2-Deficient Mice. From 2014 I have been a sessional lecturer at the University of Toronto and have taught MIE342: Circuits with Applications to Mechanical Engineering Systems, MIE444: Mechatronics Principles and APS106: Fundamentals of Computer Programming. My research interests include signal processing for the analysis of electroencephalogram (EEG) data, machine learning for prediction and treatment of mental illnesses such as depression, schizophrenia and epilepsy, additional interests include brain computer interfaces (BCI) and artificial intelligence.

### **Sinisa's Project:**

Suicide is a major public health concern, especially for veterans and military personnel. Currently in the USA the number of military personnel who die by suicide exceeds the number killed in combat. A large part of the challenge has been that early symptoms such as depression, posttraumatic stress disorder, anxiety and suicide ideation are often left ignored and may be seen as a form of weakness, and likely to lead to a loss of job opportunities or promotion. For example a pilot would be less inclined to admit to having suicide ideation for fear that they may lose their flying privileges.

The ability to predict suicidal thinking has been near chance levels for decades with the majority of the techniques using limited data or examining predictors in isolation. In this study we applied machine learning techniques to predict suicide ideation from questionnaire data obtained from the Parkwood Operational Stress Injury Clinic in London, Ontario. Using data from 738 patients and examining 224 questionnaire variables ranging from demographic information, patient health, alcohol usage to military deployment experiences, we show that we can correctly identify suicide ideation in over 80% of the subjects. More importantly we can achieve these results with as few as 10 questions. Interestingly our machine learning techniques show that the important questions have nothing to do with occupational experiences, but rather patient quality of health, in particular physical indicators of anxiety. For example “are you feeling bad, like a failure, let people down?”, “did you have nausea and upset stomach during the last panic attack?”, and “are you feeling your heart race/pound?” were some of the top questions used in the diagnosis of suicide ideation.

These results suggest that machine learning techniques could be used to screen military personnel for suicidal risk and provide opportunity for early preventative interventions. Our hope is that machine learning based approaches would provide tools to improve the health and well-being of Canadian military personnel, veterans and their families by maximizing evidence-informed practices, policies and programs.

Read Sinisa's full abstract [here](#).