UBC Department of Psychiatry

Research Day

Creating knowledge, caring for minds

ABSTRACTS

ORAL PRESENTATIONS

Speaker#1: Reza Shalbaf | Postdoc Researcher Fellow "Auditory steady-state response as predictor of clinical response to rTMS in treatment resistant depression" (Faculty Sponsor: Fidel Vila-Rodriguez)

Speaker#2: Juliana Negreiros | Ph.D., R. Psych., Postdoctoral Fellow "Potential Neurocognitive Deficits in Pediatric Obsessive-Compulsive Disorder (OCD)" (Faculty Sponsor: Dr. S. Evelyn Stewart)

Speaker#3: Blair Jovellar | Graduate Student "Mesoscale cortical calcium imaging in a mouse model of Electroconvulsive Therapy" (Faculty Sponsor: Dr. Tim H. Murphy)

Speaker#4: Golnaz Naderkhani | Resident "Neandertal Origin of Genetic Variation in Attention-Deficit/Hyperactivity Disorder (ADHD) and Other Psychiatric Phenotypes" (Faculty Sponsor: Dr. M Abdel-Fattah)

Speaker#5: Rebecca Zivanovic | PGY1 "Death by Suicide in Canadian Medical Students: A Pilot Study" (Faculty Sponsor: Dr. Christine Roston)

Speaker#6: Dr. Nicholas Ainsworth | PGY2 "Clinical effectiveness of electroconvulsive therapy in clozapine-refractory psychosis: A prospective, matched-control cohort study" (Faculty Sponsor: Dr. Fidel- Vila-Rodriguez)

NON FACULTY ORAL PRESENTATIONS ABSTRACTS

Speaker #1. **Auditory steady-state response as predictor of clinical response to rTMS in treatment resistant depression.**

Presenter: Reza Shalbaf | Postdoc Researcher Fellow

Authors: Reza Shalbaf , Christopher Pang, Fidel Vila-Rodriguez

Faculty Sponsor: Fidel Vila-Rodriguez

Introduction: Biological markers of treatment response could significantly aid in personalizing treatment prescription as well as treatment course monitoring, thereby resulting in better outcomes and efficiency during treatment initiation (1-2). Auditory steady-state response (ASSR) is an electrophysiological paradigm where brain responses get entrained to the frequency and phase of periodic auditory stimuli (3-5).

Methods: 20 patients with treatment resistant depression (TRD) were recruited using repetitive transcranial magnetic stimulation (rTMS), and underwent eyes open electroencephalogram (EEG) before receiving treatment. Click trains presented at 20 and 40Hz evoked ASSR. We used FCz electrode to evaluate ASSR using Event related spectral perturbation (ERSP) and Inter-Trial Coherence (ITC). The total score of the 17-Item Hamilton Rating Scale for Depression (HRSD-17) was the primary outcome measure.

Results: When EEG at baseline were grouped as a function of treatment response, TRD patients who did not respond to rTMS treatment exhibited significant reduction in ERSP and ITC relative to those patients responding to rTMS for 40 Hz stimulation ($p<0.05$), while there were no pronounced changes at frequencies of 20 Hz stimuli.

Conclusions: Our data support differences in neural oscillations between responders and non-responders whereby non-responders exhibit significantly poorer entrainment. In addition, data showed reduced low (40 Hz) gamma band ASSR power and phase synchronization with no significant beta band ASSR reduction in TRD non-responders. Inhibitory interneuronal activity dysfunction has been suggested as a putative molecular mechanism underlying TRD, and ASSR within the gamma band neural oscillations might be associated with this mechanism and hence a potential biomarkers of response to rTMS treatment in TRD patients.

Speaker #2. **Potential Neurocognitive Deficits in Pediatric Obsessive-Compulsive Disorder (OCD)**

Presenter: Juliana Negreiros | Ph.D., R. Psych., Postdoctoral Fellow, UBC Psychiatry

Authors: Juliana Negreiros

Faculty Sponsor: Dr. S. Evelyn Stewart | MD, UBC Department of Psychiatry

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Introduction: There is increasing interest in determining whether neurocognitive deficits are a common characteristic of pediatric OCD. While most studies have assessed neurocognition via standardized testing, few have explored it through parent/youth report. This is of concern as differences between test performance and real-life behaviours have been documented in the literature.

Objective: To investigate neurocognitive functioning in OCD-affected youth compared to healthy controls (HCs) using standardized testing and parent/youth questionnaires.

Methods: Participants included 72 OCD-affected youth and 63 HCs. Standardized neurocognitive assessment was conducted using the *CANTAB*. The *BRIEF* assessed youth's daily behaviour associated with executive function (EF) domains via parent/youth report. Independent t-test analyses were conducted ($p<0.05$).

Results: Groups did not differ with respect to age, IQ or gender. Standardized testing revealed significant differences with respect to visual memory ($p<0.001$) and planning ($p=0.02$), but not with cognitive flexibility, response inhibition, decision-making, spatial working memory, or attention. Based on parent and youth report, OCD-affected youth demonstrated significantly greater executive dysfunction associated with daily behaviour compared to HC ($p<0.001$).

Conclusions: Neurocognitive deficits should be considered in pediatric OCD. Potential discrepancies between parent/youth reports regarding daily function and performance under 'ideal' settings point to the need for multi-modal assessment.

Speaker #3. **"Mesoscale cortical calcium imaging in a mouse model of Electroconvulsive Therapy"**

Presenter: Blair Jovellar | Graduate Student

Authors: Blair Jovellar, University of British Columbia; Jeffrey LeDue, University of British Columbia; Fidel Vila-Rodriguez, University of British Columbia; Timothy H. Murphy, University of British Columbia

Faculty Sponsor: Dr. Tim H. Murphy | PhD

Introduction: Depression is a leading cause of disability worldwide. As a treatment for depression, electroconvulsive therapy (ECT) remains the most effective. In spite of such unparalleled efficacy, our understanding of the therapeutic mechanisms of ECT remains lacking. Using Electroconvulsive stimulation (ECS)—an animal model of ECT—we determine how ECT alters the mesoscale spatiotemporal activity of different brain regions.

Methods: Wide-field fluorescent imaging of resting-state activity was performed in awake head-fixed mice expressing GCaMP6 (a genetically-encoded calcium indicator). This allows longitudinal imaging of intracellular calcium which reflect changes in spiking activity at a cellular level. ECS was done once daily, every other day, for a total of 10 treatments. Imaging was done daily ~10 min and 24h after ECS.

Results: Quantification of GCaMP6 fluorescence revealed increased fluctuation from the mean spontaneous activity in multiple brain regions involved in the default mode network such as the retrosplenial cortex, anterior cingulate, and parietal association areas. This parallels the increased amplitude of low-frequency fluctuations (ALFFs), which is a measure of regional brain activity, in some fMRI studies (Liu, et al., 2015). This in vivo calcium imaging method also revealed global decreases in correlation of activity between brain regions.

Conclusion: These findings recapitulate the decrease in functional connectivity observed in human ECT (Perrin et al., 2012) using this electroconvulsive stimulation (ECS) animal model. Additionally, ECS also results in region-specific increases in spontaneous activity.

Implications: To our knowledge, this is the first animal model that incorporates longitudinal imaging of spiking activity after ECS. This provides opportunities to further dissect the therapeutic mechanism of ECT.

Speaker #4. **Neandertal Origin of Genetic Variation in Attention-Deficit/Hyperactivity Disorder (ADHD) and Other Psychiatric Phenotypes**

Presenter: Golnaz Naderkhani | Resident

Authors: Golnaz Naderkhani

Faculty Sponsor: Dr. Mohamed M. Abdel-Fattah | MD, MHA, FRCPC

Introduction: Genomic analysis of contemporary Eurasians has revealed a small fraction of inherited DNA from interbreeding of Anatomically Modern Human (AMH) with Neandertals. The influence of this admixture on psychiatric traits is largely unknown.

Methods: We identified and compared phenotypic annotation of over 100,000 Neandertal-specific alleles with a frequency and chromosome matched population of non-Neandertal alleles.

Results: Overall, the Neandertal-specific alleles were significantly associated with more mental and behavioral phenotypes that any other ICD-10-CA classes of morbidity. Within the 672 identified alleles associated with mental and behavioural disorders, Neandertal alleles explained a statistically significant fraction of the variation risk for Attention-Deficit/Hyperactivity Disorder (ADHD) (OR 3.65, 95 % CI 1.3-10.26, P = 0.009). We found widespread signatures of positive selection ($P < 0.05$) in Neandertal-specific alleles linked to ADHD in 11 International Hap-Map Project populations.

Conclusion: Our results establish that admixture with Neandertals explains a significant fraction of the variation in risk for ADHD.

Relevance/implications: From an evolutionary psychiatry perspective, it is possible that some DSM-defined mental "disorders" are a result of adaptive responses in the early modern human population. Perhaps focusing on the strength of people with ADHD and providing opportunities and environments where they can flourish should be a more important consideration in their overall rehabilitation and treatment plan.

Speaker #5. **Death by Suicide in Canadian Medical Students: A Pilot Study**

Presenter: Rebecca Zivanovic | PGY1, Psychiatry, Research Track

Authors: Rebecca Zivanovic, Dr. Christina Roston

Faculty Sponsor: Dr. Christina Roston

Introduction: Suicide is the 9th leading cause of death in Canada with higher rates in the age-matched group for medical students. Despite evidence that medical students experience high rates of stress, depressive symptoms and suicidal ideation, data on suicide in Canadian medical schools is lacking.

Methods: A survey was sent to the Student Affairs offices at all 17 Canadian MD programs to acquire data on medical student suicides from 2006-2016. Data on the presence of institutional suicide statistics collection and response policies was also collected.

Results: Sixteen MD programs (94%) participated. Six suicides (3 male, 3 female) were reported. Five of the six suicides occurred in the upper years of study. The number of outcomes precluded the calculation of a reliable suicide rate. Seven (44%) MD programs reported keeping statistics on student deaths including suicides and 10 (63%) reported having policies in place for what to do in the event of a suicide.

Conclusions: These results highlight the importance of death by suicide in Canada's medical student population and the limits of both our knowledge of this problem and capacity to respond to it.

Implications: This study has started discussion across Canadian medical schools about the importance of prospective tracking of deaths by suicide.

Speaker #6. **Clinical effectiveness of electroconvulsive therapy in clozapine-refractory psychosis: A prospective, matched-control cohort study**

Presenter: Dr. Nicholas Ainsworth | PGY-2 Resident

Authors: Dr. Nicholas Ainsworth

Faculty Sponsor: Dr. Fidel Vila-Rodriguez

Introduction: Treatment-resistant and clozapine-resistant psychosis (TRP/CRP) comprise some of the most difficult psychiatric illness to manage. Given observational and early RCT evidence for electroconvulsive therapy (ECT) in TRP/CRP, we wished to investigate its effectiveness in the highly refractory population at the BC Psychosis Program (BCPP).

Methods: We examined outcomes in patients admitted to BCPP since 2012 who received ECT during admission; these were compared against a sample of patients who received treatment as usual (TAU). Patients who received ECT were matched to controls based on age, sex, diagnosis, and clinical severity. Clozapine resistance was determined based on the TRRIP criteria. The primary outcome (response) was defined as a ≥20% reduction in the PANSS positive symptom subscale.

Results: Twenty patients who received ECT and 20 matched controls were identified (n=40). The most common primary diagnosis was schizophrenia. The frequency of clozapine resistance was 90% in the ECT group and 60% in the TAU group. Mean PANSS positive score reductions during admission were 20% in the ECT group versus 12% in the TAU group. At discharge, 50% of patients in the ECT group met criteria for response versus 40% of the TAU group.

Conclusion: The data presented here support the hypothesis that ECT is an effective intervention for treatment-refractory psychosis, including as an adjunct to clozapine in patients who become resistant to its effects. Our findings further suggest that ECT may have superior effectiveness, in the acute setting, to standard pharmacological treatment in TRP.

Implications/Relevance: Despite clozapine's success as a treatment for refractory psychotic illness, its response rate remains modest (about 30%). The use of ECT in this population has the potential to substantially improve clinical outcomes. Future work should address longer-term outcomes following acute administration of ECT, and its efficacy as an alternative to a first trial of clozapine.

POSTERS –BASIC NEUROSCINCE AND TRANSLATION RESEARCH ABSTRACTS

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POSTER PRESENTATIONS-BASIC NEUROSCINCE AND TRANSLATIONAL RESEARCH

Poster #1.	**Apolipoprotein E Genotype Influence on Symptomatic, Functional, and Imaging Outcomes After Mild Traumatic Brain Injury**
Presenter:	Alex Cheng | Graduate Student
Authors:	Alex Cheng
Faculty Sponsor:	Dr. William Panenka, Department of Psychiatry

Background. Apolipoprotein E (APOE) is critical to lipid transport in the CNS, and is the most powerful known genetic determinant of poor long term outcomes after mild traumatic brain injury (MTBI). Given the high lipid content of neuronal membranes in CNS white matter, white matter may be sensitive to APOE genotype after MTBI. APOE may also influence acute clinical outcomes after MTBI.

Hypothesis. After MTBI APOE4 carriers would show a DTI pattern reflective of lower white matter integrity, and more specifically lesser neuronal membrane integrity as evidenced by higher radial diffusivity compared to non-APOE4 carriers. APOE4 carriers would also demonstrate more post-traumatic symptoms and take longer to return to work, than non-carriers.

Methods. 74 subjects who presented with acute MTBI and 40 controls who presented with orthopaedic injuries to the emergency department in Tampere, Finland were recruited as part of a larger study. Subjects underwent Diffusion Tensor Imaging (DTI) within the first 10 days after MTBI. Tract based spatial statistics (TBSS) was used to compare APOE4 carriers with non-carriers.

Results. APOE4 carriers took longer to return to work than non-carriers (mean time 71 days versus 49 days). Post-concussion symptomatology was not significantly different between the groups. Compared with non-APOE4 carriers, APOE4 carriers had greater Radial Diffusivity after MTBI. Orthopedically injured controls showed no differences when stratified by APOE4 status.

Discussion. APOE4 was not related to post-concussion symptomology following MTBI, but did predict a longer return to work interval. APOE genotype may also influence acute DTI imaging findings after MTBI.

Poster #2.	**Real-time evaluation of BACE1 activity on APP C99 site through a novel cell-based protein reporter**
Presenters:	Bruno Herculano
Authors:	Bruno Herculano, Zhe Wang and Weihong Song
Faculty Sponsor:	n/a

Introduction: Current research on Alzheimer's Disease (AD) has at its core the generation of the Amyloid-beta peptide (Aβ) through the cleavage of the Aβ Precursor Protein (APP) by β-secretase (BACE1), though its specific regulatory factors are not yet completely understood. Currently available techniques for evaluating BACE1 rely on in vitro assays, limiting their usefulness. Herein we describe a novel cell-based approach that mimics BACE1-mediated cleavage of APP, generating readily observable reporters that could be utilized for real-time assessment of BACE1 activity and screening of potential pharmacological treatments aiming at inhibiting or modulating BACE1.

Methods: We have generated a custom construct (ASGβ; Albumin-SEAP-eGFP-β site) expressing a chimera protein containing the β-site of APP and reporter signals. The alpha and gamma cleavage sites were remove to ensure specificity of the cleavage.
The coding region for this construct was inserted into a pcDNA3.1 vector and transfected into HEK cells, concomitantly with a pcDNA4 vector containing the coding region for BACE1. Thorough selection was carried out through the use of Zeocin and Geneticin (G418) in order to generate a stable cell line expressing both ASGβ and BACE1.

Results: ASGβ is stably expressed at a high level upon transfection, and can be maintained indefinitely in a stable cell line. Co-expression with BACE1 demonstrably causes ASGβ to be cleaved at the expected BACE1 target site, generating an N-terminal fragment containing SEAP and eGFP as reporters that is subsequently released into the medium. This feature allows for real-time measurement of BACE1 activity through a phosphatase assay, with as little as 50 microliters of culture medium, and with minimal disturbance to the cultured cells. Cleavage by BACE1 also generates a C-terminal fragment that can be easily observed through Western blot, which can be used to confirm results obtained in any given experiment. Specificity of BACE1 cleavage was further confirmed through the use of BACE1 inhibitor IV.

Poster #3. **Movement Initiation in GCaMP6s Mice is Preceded by Stereotyped, Multi-Second Dorsal Cortex Dynamics**

Presenter: C. Mitelut

Authors: Mitelut C, Luo AX, Silasi G, Sekino Y, Boyd JD, Bolanos F, Swindale NV, Murphy TH

Faculty Sponsor: n/a

Abstract: Modern experimental neuroscience has sought to identify the neural correlates of free, or voluntary, behaviour largely focusing on instructed task paradigms in humans using fMRI or EEG (Haggard 2008). Such studies are limited in their temporal and spatial precision and have been criticized for their reliance on subjective reporting of intention (Mele 1992).

Here we show that preparation of spontaneous (i.e. uncued) behaviour can be studied in mice using head restrained paradigms. We recorded calcium activity in dorsal cortex of GCaMP6 transgenic mice (Ai93 and Ai94) along with simultaneous recordings of a lever deflection angle in a pulling task (11/11 mice) and behavioral videos (5/11 mice). We sought to identify neuronal dynamics preceding the initiation of three behaviours: lever pulling, grooming and licking. To automate detection of grooming and licking behaviours using video annotation, we segmented the foreground from each frame using mixture of Gaussians, projected it to PCA space and binary Random Forest classifiers were trained on the features to detect behaviour initiation time. During each ~20 minute recording session (30-50 sessions/mouse) we identified quiescent periods (i.e. animal was motionless for 3s or more) preceding lever pulling (~20-100/session), grooming (10-40/session) and licking (10-30/session) and evaluated calcium activity (dF/F0) in three cortical ROIs: motor, limb and retrosplenial (RS). We found that lever pulling was preceded by limb cortex calcium activation patterns of up to 2% as early as 7 seconds (or more) prior to movement initiation - consistent with findings of early prediction of cognitive performance in humans (Soon 2008). In contrast, grooming was preceded by ~1s of cortical activation and licking by 2-3s. Interestingly, rather than arising from a ~0% dF/F0 baseline and following monotonic activation of limb and motor cortex - all behaviours were initiated during the second activation phase of an activation-depression-activation cycle in limb cortex. This suggests that spontaneous behaviours arise from ongoing large-scale oscillations. We additionally found that during lever pulling cortical activation peaked at different times in different ROIs: RS activation peaked 1sec before behaviour initiation, whereas motor cortex activation peaked on behaviour initiation (i.e. t=0s) and limb cortex 1s after initiation. This suggests that the distinct roles cortical regions play in complex behaviour preparation and execution can be studied at the mesoscale level using GCaMP6 signals. Lastly, we found that over several weeks of lever pulling sessions, neural activity preceding and following lever pulling became less noisy (i.e. standard deviation of cortical activity in the ROIs decreased up to 80%) suggesting a neural correlate of learning may be accessible via widefield imaging.

These results are consistent with research in humans that behaviour preparation begins substantiallyearlier than is available to higher order faculties (e.g. awareness in humans). The findings further validate the use of widefield imaging in GCaMP6 mice to study learning and behaviours during task acquisition paradigms and the further investigation of spontaneous behaviour in non-human animals using task-free, non-reporting paradigms.

Poster #4. **A review of research on female perpetrators of child sexual abuse**

Presenter: Elnaz Bondar | Undergraduate

Authors: Deborah Connolly, Urs Ribary

Faculty Sponsor: n/a

Abstract: The goal of this study is to review empirical and clinical research of child sexual abuse, which may lead to female perpetrators later in life. Childhood incident of sexual abuse in perpetrators' life is considered to be a potential risk factor for the perpetrators to sexually abuse children.

Articles were searched via PubMed and PsychInfo using the keywords "female perpetrator", "child sexual abuse", "sexual abusers", and "female child abusers"; 5,705 articles were found. We selected articles that investigated the characteristics of female perpetrators of child sexual abuse and were published between 1975-2016. Thirty-nine articles met these criteria.

The following factors have been investigated: the importance of history of CSA victimization, the impact of CSA on victims; the characteristics of female perpetrators of CSA, and differences in characteristics between female and male perpetrators of CSA. The findings of the present review are crucial and valuable in understanding female perpetrators of CSA and can be used to target an appropriate therapeutic intervention.

A comprehensive profile of female perpetrators with a history of child sexual abuse, and subsequent recommendations could be of enormous value to clinicians, therapists and the legal system dealing with legal judgments and possible interventions for female perpetrators of CSA.

Poster #5. **Neuroprotective role of circulating biological markers in multiple sclerosis Characterizing the role of ARNT2**

Presenter: Gabrielle Chartier | Resident

Authors: Gabrielle Chartier

Faculty Sponsor: Jacqueline Quandt | Department of Pathology

Introduction: Multiple Sclerosis (MS) is the most common immune-mediated inflammatory demyelinating disease of the central nervous system (CNS). Depression and cognitive impairments appear to be an early sign of the disease. ARNT2 is a transcription factor that seems to play a key role in neuroprotection and has been described in multiple areas of the CNS, namely in the hippocampus.

Methods: ARNT2 expression was analyzed in experimental autoimmune encephalomyelitis (EAE) animal model. Neuronal and glial cultures were exposed to inflammatory cells and mediators and expression levels of ARNT2 was analyzed by Western Blotting, qPCR and immunohistochemistry.

Results: ARNT2 is elevated prior to disease onset in EAE brains but decrease in lesioned areas at peak disability. Oxidative stress altered neuronal ARNT2 protein expression in vitro: constitutive ARNT2 levels were temporarily increased with low oxidative stress and sustained ARNT2 expression was associated with neuronal survival.

Conclusion: Our studies are the first to describe ARNT2 regulation in animal models of MS and have shown that the expression of ARNT2 is altered through disease onset. Loss of ARNT2 is associated with greater disability.

Relevance/implications: These findings implicate ARNT2 in MS pathogenesis and highlight it's role as a plausible biomarker or target for therapeutic intervention.

Poster #6. **Cortical functional hypoconnectivity and region-specific increase in fluctuation from mean activity in a mouse model of electroconvulsive therapy**

Presenter: D. Blair Jovellar | Graduate Student

Authors: D. Blair Jovellar, University of British Columbia; Jeffrey LeDue, University of British Columbia; Fidel Vila-Rodriguez, University of British Columbia; Timothy H. Murphy, University of British Columbia

Faculty Sponsor: Tim H. Murphy | PhD

Introduction: Depression is a leading cause of disability worldwide. As a treatment for depression, electroconvulsive therapy (ECT) remains the most effective. In spite of such unparalleled efficacy, our understanding of the therapeutic mechanisms of ECT remains lacking. Using Electroconvulsive stimulation (ECS)—an animal model of ECT—we determine how ECT alters the mesoscale spatiotemporal activity of different brain regions.

Methods: Wide-field fluorescent imaging of resting-state activity was performed in awake head-fixed mice expressing GCaMP6 (a genetically-encoded calcium indicator). This allows longitudinal imaging of intracellular calcium which reflect changes in spiking activity at a cellular level. ECS was done once daily, every other day, for a total of 10 treatments. Imaging was done daily ~10 min and 24h after ECS.

Results: Quantification of GCaMP6 fluorescence revealed increased fluctuation from the mean spontaneous activity in multiple brain regions involved in the default mode network such as the retrosplenial cortex, anterior cingulate, and parietal association areas. This parallels the increased amplitude of low-frequency fluctuations (ALFFs), which is a measure of regional brain activity, in some fMRI studies (Liu, et al., 2015). This in vivo calcium imaging method also revealed global decreases in correlation of activity between brain regions.

Conclusion: These findings recapitulate the decrease in functional connectivity observed in human ECT (Perrin et al., 2012) using this electroconvulsive stimulation (ECS) animal model. Additionally, ECS also results in region-specific increases in spontaneous activity.

Implications: To our knowledge, this is the first animal model that incorporates longitudinal imaging of spiking activity after ECS. This provides opportunities to further dissect the therapeutic mechanism of ECT.

Poster #7. **Measuring glutamate transmission in Huntington disease using iGluSnFr, an optogenetic probe**

Presenter: Ellen Koch | Graduate Student

Authors: Koch ET, Woodard CL, Sepers MD, Raymond LA.

Faculty Sponsor: Dr. Lynn Raymond | UBC Hospital

Abstract: Huntington disease (HD) is a neurodegenerative disorder caused by an autosomal dominant genetic mutation, and characterized by motor, psychiatric and cognitive deficits. Degeneration of striatal medium spiny neurons is a key feature of the disease, along with cortical atrophy. Glutamate is an important excitatory neurotransmitter and dysfunction in its signalling is associated with HD. The YAC128 mouse model of HD was previously demonstrated to exhibit increased glutamate release at 1 month of age and decreased release at 12 months. However, little is known about alterations in mechanisms or modulation of cortical glutamate release onto striatal neurons in HD. An optogenetic probe, iGluSnFr, is a genetically-encoded reporter that allows for sensitive measurement of glutamate dynamics. We exposed brain slices to conditions known to decrease cortical-striatal glutamate release, including low calcium and pharmacological activation of autoreceptors. Our results showed that the iGluSnFr signal decreases under these conditions, verifying this probe as an accurate measure of glutamate release. We are now testing effects of pharmacological manipulation of presynaptic glutamate and endocannabinoid receptors on glutamate release at corticostriatal synapses in YAC128 HD and wild-type mouse brain slices. The iGluSnFr provides a new approach to measuring glutamate release that can help us understand HD pathology.

Poster #8. **The Dynamic Social Brain**

Presenter: Ryan Kopstick | Graduate Student

Authors: Ryan Kopstick

Faculty Sponsor: Dr. Christine M. Tipper | BC Children's Hospital Research Institute

Introduction: There is debate over whether autism spectrum disorder (ASD)-related interpersonal difficulties are result from disruptions in non-verbal social brain processes supporting "mirroring" (understanding another's actions through a shared neural code for observing and performing actions), or "mentalizing" (deliberate consideration of another's state of mind, intentions or beliefs).

Methods: As a first step toward quantifying mirroring and mentalizing brain functions in individuals with ASD, this study utilized high-density electroencephalography (dEEG) during a naturalistic social cognition task, in neurotypical adults (N = 25).

Results: Preliminary dEEG data (N = 10) revealed different ERPs and patterns of event-related changes in neuronal oscillatory synchronization in the alpha and beta frequency bands over frontal, parietal and temporal cortical sites for peculiar means, intentions, and social interactions.

Conclusion: The brain codes multiple dimensions of observed actions, and different neural networks are involved in representing means ("mirroring"), intentions ("mentalizing"), and social interactions. Ongoing analyses will localize distinct mirroring and mentalizing networks and chart their interactions during naturalistic social cognition.

Relevance: This study is the first to quantify functional dynamics between mirroring and mentalizing brain networks during naturalistic social cognition. Follow-up experiments will examine social brain dynamics in neurotypical youth (aged 14-18), and youth diagnosed with ASD.

Poster #9. **USP25 regulates notch signaling during the development**

Presenter: Yuhang Liu | International Student

Authors: Yuhang Liu

Faculty Sponsor: Weihong Song

Abstract: Protein Ubiquitination plays a critical role in development. But the mechanism is not clear. Ubiquitin-specific protease (USP) 25, a member of the USP family, has a function of deubiquitination. Our research shows that the mRNA expression of USP25 in the developmental stages of xenopus laevis. We find that the location of the mRNA expression of USP25 in the last stage of development in xenopus laevis. Also we find the mRNA expression of USP25 in the developmental stages of different organ of mice. Furthermore, we investigate the USP25 activates the notch signaling, including Notch1, ΔE and NICD, in the HEK293 cell line. In addition, our research suggests the usp25 activates the Hes-1 promoter depend on the notch signaling.

Poster #10. **Neuronal swelling during spreading depression involves the new Cl- channel, slc26a11**

Presenter: Yanqi Liu | Gradate Student

Authors: Yanqi Liu

Faculty Sponsor: Brian MacVicar |Department of Psychiatry

Introduction: Cortical spreading depression (CSD) is a transient wave of neuronal depolarization propagating across the neocortex followed by periods of electrical silence. CSD is implicated in neurological diseases such as stroke, traumatic brain injury, and migraine aura. During CSD, morphological changes of neurons include swelling of the soma and dendritic beading ("bead on a string" appearance). A previous study in the lab identified a chloride channel, SLC26A11, as an essential component mediating neuronal swelling during cytotoxic edema (Rungta et al (2015) Cell). In addition, this channel was observed to be activated at depolarizing potentials. Given that CSD also involves neuronal depolarization and neuronal swelling, the aim of this study is to investigate the role of the SLC26A11 channel in neuronal swelling during CSD and its contribution to other features of CSD.

Method: Two photon optical imaging with simultaneous field potential recordings were adopted to measure neuronal swelling, eletrophysiological and other optical signatures of CSD in the primary somatosensory cortex in GFP transgenic mice.

Results: We found that neuronal swelling was significantly reduced by GlyH-101, an inhibitor of the SLC26A11 chloride channel. However, electrophysiological and optical characteristics of CSD were mostly unaffected by GlyH-101.

Conclusion, future direction and implications: In the future, we will use a siRNA knockdown approach to further confirm the involvement of the SLC26A11 channel in neuronal swelling and CSD. These observations shed light on the sequence of events during CSD and help dissect out individual components of these events.

Poster #11. **Persistent activity of networks engaged during language and executive function tasks in schizophrenia patients.**

Presenter: Nicole Sanford | Graduate Student

Authors: Nicole Sanford

Faculty Sponsor: Todd Woodward | UBC Psychiatry

Background: Widespread cognitive dysfunction is a hallmark of schizophrenia. As part of a larger data-sharing study mapping brain networks altered in schizophrenia, we examined two tasks engaging language and executive functions in schizophrenia patients and controls.

Methods: Participants completed one of two fMRI tasks: (1) a thought generation task (TGT), where participants either listened to or generated a definition of a given noun, and (2) a task-switching Stroop task, where participants either read a word ("green", "red", "yellow", "blue") or named the font colour of the text displayed. The datasets were simultaneously submitted to fMRI-constrained principle component analysis (fMRI-CPCA).

Results: Four networks were extracted, reflecting: (1) motor response, (2) default-mode network deactivation, (3) language, and (4) cognitive evaluation. In the Stroop task, schizophrenia patients exhibited longer activation of the response network, delayed activation of the evaluation network, and less deactivation of the default-mode network compared with controls. Group differences were negligible for TGT.

Conclusion: The alterations in brain activity may explain previously observed deficits in response inhibition and other executive functions in schizophrenia.

Relevance/Implications: Elucidating the cognitive processes and underlying neurological activity in different tasks will help refine our understanding of abnormal functional connectivity in schizophrenia and other brain disorders.

Poster #12. **Placebo and Nocebo Effects in Youth: The Role of Awareness and Executive Functioning**

Presenter: Ella Weik | Graduate Student

Authors: Ella Weik , Regula Neuenschwander

Faculty Sponsor: Dr. Tipper, Co-Supervisor: Dr. Oberlander.

Introduction: Little is known about placebo and nocebo effects in youth and how they may be used for therapeutic benefit. To determine underlying mechanisms of placebo and nocebo, we tested the effect of classical conditioning (consciously and non-consciously perceived cues linked to specific temperatures delivered to the hand) on thermal ratings. Furthermore we investigated whether executive function (EF) mediates these effects.

Methods: N=35 adolescents (n=26 male, 14-17 years) completed a Flanker task and a thermal perception paradigm. In the conditioning phase, visual cues were paired with two individually calibrated thermal intensities (low/high). During the testing phase, these cues plus a neutral cue were presented (supra/subliminal) with a moderate thermal stimulus. Thermal ratings were assessed.

Results: We found a significant main effect for cues, $F(2,62)=6.5$, $p<.01$. [Pairwise comparisons between low/control (ns), high/control ($p=.08$), low/high ($p<.05$)] but no effect for conscious awareness. The nocebo ($B=.018$ (.025)) but not the placebo effect ($B=.033$ (.028)) was mediated by EF.

Conclusions: Conditioning led to trend-level amplified (nocebo), but not attenuated (placebo) thermal perceptions in youth. EF may play a crucial role in the nocebo effect.

Implications: This study contributes to identifying cognitive and affective factors underlying analgesic nocebo responses in youth.

Poster #13. **Modulation of innate immunity by amyloidogenic peptides: Systematic review of pattern recognition receptors and peptide aggregation state**

Presenter: Clara Westwell-Roper | PGY1 resident

Authors: Clara Westwell-Roper

Faculty Sponsor: Bruce Verchere | BC Children's Hospital Research Institute

Introduction: Amyloid formation contributes to the development and progression of multiple aging-associated neurodegenerative disorders. Interactions between amyloidogenic peptides and tissue-resident macrophages are critical for both amyloid clearance and cytokine-mediated parenchymal dysfunction. While microbial and pancreatic amyloids may contribute to brain amyloidogenesis, it is unclear whether these diverse peptides trigger common mechanisms of innate immune activation.

Methods: To review existing evidence for activation of membrane-bound and cytosolic pattern recognition receptors (PRRs) by amyloidogenic peptides and determine corresponding peptide aggregation states, we systematically searched Embase, PubMed, and Medline according to Prisma guidelines for empiric studies through February 2017.

Results: We identified 150 studies of diverse amyloidogenic peptides – including amyloid-beta, tau, alpha-synuclein, cellular prion protein, serum amyloid A, islet amyloid polypeptide, and bacterial Curli fibrils – with evidence for scavenger receptor-mediated phagocytosis and templating, Toll-like receptor- (TLR-) mediated inflammasome priming, and inflammasome activation. All peptides associated with local amyloid diseases were reported to activate TLR2 and NACHT, LRR and PYD domains-containing protein 3 (NLRP3). 76 controlled studies implicated soluble species (34%), insoluble fibrils (24%), or multiple aggregation states (35%).

Conclusions: Both early and late aggregates of amyloid-forming peptides contribute to distinct, evolutionarily conserved pattern recognition events. Amyloidogenic peptides may act as particularly potent pro-inflammatory stimuli because of their priming and activation of inflammasomes.

Implications: An understanding of the interaction between peptide aggregates and innate immune cells will aid in the development of anti-amyloid and immune-modulating therapies.

Poster #14. **BACE1 cleavage site selection critical for amyloidogenesis and Alzheimer's pathogenesis**

Presenter: Zhe Wang

Authors: Zhe Wang, Shuting Zhang, Fang Cai, Mingming Zhang, Yili Wu, Jing Zhang, and Weihong Song

Faculty Sponsor: n/a

Introduction: Amyloid plaque is the hall mark of Alzheimer's disease(AD). As the major component of the plaque, Abeta is derived from sequential cleavages of amyloid precursor protein(APP) by BACE1 and gamma-secretase complex. In addition to cleaving APP at the beta-site producing the Abeta precursor C99, BACE1 also cleaves APP within the Abeta region at the beta'-site to shed C89 that is processed into truncated Abeta after gamma-secretase cleavage. While dosens of APP mutations have been identified in AD patients, APP A673V substitution (within the Abeta region) found in an Italian family is the only recessively inherited AD pathogenic mutation.Here we show that BACE1 cleaves wild type APP mainly at the non-amyloidogenic beta' sitebut not the beta-site.This cleavage preference is hugely invereted by the A673V mutation in APP. On the other hand, however, C99 with the A673V subsitution undergoes robust protesome degradation and the mature APP A673V mutant displays faster lysosome dependent degradation, which reduced the amounts of gamma-secretase and BACE1 substrates, respectively. Together, the changed BACE1 cleavage preference in APP by the A673V mutation makes this mutant pathogenic, but the alter trafficking/degradation pathways reduce the toxicity of this mutation. Therefore, the dosage of this mutant is crucial for AD pathogenesis.

POSTER PRESENTATIONS TRANSLATIONAL AND CLINICAL RESEARCH

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Sharon So-Hyun Ahn | Research Assistant

Poster #2. **Brain volumetric abnormalities in recent first episode manic patients with bipolar I disorder**

Shyam Sundar Arumugham | Fellow in Mood disorders

Poster #3. **Resting State Functional EEG Connectivity Predicts Therapeutic Remission to rTMS in Major Depressive Disorders**

Dorian Aur

Poster #4. **The acute effects of a combined yoga and transcranial direct current stimulation on neurophysiological markers**

Marlon Danilewitz | MD Psychiatry Resident

Poster #5. **Recovery: Well-being & Hope in the Early Stages of Bipolar Disorder**

Taj Dhanoa | Graduate Student

Poster #6. **n/a**

Fawcett

Poster #7. **Differential functional connectivity of the rostral and subgenual cingulate cortex predict outcomes of treatment with rTMS for treatment-resistant depression**

Ruiyang Ge | Postdoctoral Research Fellow

Poster #8. **Confidential Review of Suicides Within Fraser Health Mental Health and Substance Use**

Dr. Sharleen Gill | Psychiatry Resident

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Katherine Green | Undergraduate Student

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Monica Ho | Undergraduate Student

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Megumi Iyar | Graduate Student

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Dr. Fern Jaspers-Fayer | Post Doctural Fellow

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Dr. Verena Langheimer | PGY-4

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Juliana Negreiros | Postdoctoral Fellow

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Andrew Perrin | Resident 4

Poster #18. **Trauma-Related Conversations on Twitter: A thematic analysis of social media discussions around PTSD and trauma**

Abnashi Singh Randhawa | Undergraduate

Poster #19. **Paternal Postpartum Depression: A Review of the Literature**

Isabel Sadowski | Research Assistant

Poster #20. **Feasibility of a Mindfulness-Based Cognitive Therapy Group Intervention as an Adjunctive Treatment for Postpartum Depression and Anxiety**

Genevieve Breau & Isabel Sadowski | Research Assistants

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Robert Selles | Postdoctoral Fellow

Poster #22. **WalkAlong: process evaluation of an online mental health portal using Google Analytics**

Michael Jae Song MPH | Intern

Poster #23. **Metabolic and Genetic Explorations in Refractory Schizophrenia Project – chromosomal variants in 1st 10 cases**

Robert Stowe | Faculty

Poster #24. **A Novel Approach to Treating Somatization in Youth: Clinical Outcomes after the Mind-Body Connection Program**

Jennifer Pooni, BSc & Reghan Strutt | BSc

Poster #25. **Working Memory Load Increases the Diagnostic Utility of Smooth Pursuit in mTBI**

Jacob Stubbs | Student with Panenka Research Group

Poster #26. **Machine Learning Predicts Response to rTMS in Depression**

Jenny Yang | Undergraduate Student

Poster #27. **The Rate of Death by Suicide in Medical Students: A Systematic Literature Review**

Rebecca Zivanovic | PGY1

POSTER PRESENTATIONS ABSTRACTS CLINICAL SCIENCE

Poster #1. **The Relationship Between Self- and Informant ratings of Daily Functioning in Bipolar Disorder and Healthy Volunteers**

Presenter: Sharon So-Hyun Ahn | Research Assistant, Mood Disorder Centre

Authors: Ahn, S., Mackala, S.A., Hıdıroğlu, C., Yatham, L.N., & Torres, I.J.

Faculty Sponsor: Dr. Ivan Torres | Clinical Associate Professor

Introduction: Assessing general functional ability in patients with Bipolar Disorder (BD) is important because patients frequently show problems in daily life. Daily functional ability can be assessed through self-report or collateral reports; however, there is currently no data on the correspondence between these different methods of assessing general functioning in patients with BD. The purpose of the study is to assess the relationship between self-and collateral report on daily functioning in patients with BD and a healthy control group.

Method: The subjects were 49 patients diagnosed with BD (mean age=38.3), and 22 healthy controls (mean age=33.5). The Barkley Functional Impairment Scale (Barkley, 2011) was used to measure daily functional impairment in both self- and collateral reports.

Results: A repeated measure ANOVA with rater (self vs. other) as a repeated measure and group (patient vs. control) as a between subject factor revealed a significant group effect—$F(1,69) = 28.929$, $p = .000$, which showed that patient ratings were worse than control ratings; however, there was no rater main effect or rater * group interaction. Within each group there was no significant correlation between self and other ratings.

Conclusion: Patients with BD experience greater impairment in their daily functioning, but there was no association between self- and collateral reports of functional impairment.

Relevance/Implications: In patients with BD, it is important to consider both self- and collateral reports of daily functioning as these sources may be providing different information.

Poster #2.	**Brain volumetric abnormalities in recent first episode manic patients with bipolar I disorder**
Presenter:	Shyam Sundar Arumugham | Fellow in Mood disorders
Authors:	Shyam Sundar Arumugham, Trisha Chakraborty, Ivan Torres, Donna J Lang, Wayne Su, Shahinfard Elham, Vesna Sossi, William G Honer, Raymond W Lam, Lakshmi N Yatham
Faculty Sponsor:	Dr. Lakshmi N Yatham | Professor of Psychiatry

Introduction: Illness duration and long term medication use may confound the results of magnetic resonance imaging (MRI) studies in bipolar disorder. Studying patients early in the course of illness may minimize these confounding effects.

Method: MRI scans of 69 patients with bipolar-I disorder (BD), who recently remitted from their first manic episode were compared with those of 76 healthy controls (HC) with voxel based morphometry. In addition, the volumes of relevant structures obtained through automated validated segmentation algorithms were compared between the two groups.

Results: VBM revealed no significant volumetric abnormalities in gray matter. White matter volume reduction was observed in the BD group in the right thalamus, left temporal lobe and left posterior cingulate regions. Comparison of segmented volumes revealed significant volume reduction in total brain white matter of the BD group, which was apparent in all four cerebral cortices. There were no significant differences in total brain volume, gray matter and lateral ventricular volumes between the groups.

Conclusion: Widespread white matter volume reduction is apparent early in the course of bipolar disorder and may be related to its pathogenesis.

Implication: Studying the pathways leading to white matter pathology in bipolar disorder may provide opportunities for prevention and treatment.

Poster #3.	**Resting State Functional EEG Connectivity Predicts Therapeutic Remission to rTMS in Major Depressive Disorders**
Presenter:	Dorian Aur
Authors:	Dorian Aur, Chris Pang, Jennifer Brown, Nick Ainsworth,Marlon Danilewitz, Daniel Blumberger, Jonathan Downar, Zafiris J Daskalakis, Joe Tham, Colleen Brenner, Raymond Lam, Fidel Vila-Rodriguez
Faculty Sponsor:	n/a

Introduction: To address the complexity of the brain rhythms in the assessment of rTMS remission in major depressive disorder (MDD) a novel measure of functional EEG connectivity based on dynamic cross-entropy (DCE) is considered.

Methods: This study compared baseline resting state functional EEG connectivity in delta band(rsDCE-delta) of remitters (R), nonremitters (NR) and healthy volunteer groups (C). RsDCE-delta values are computed for segmented data from sample entropy values as described in (Aur and Vila-Rodriguez, 2017). One way ANOVA, multiple comparisons testing, ROC analyses in addition to permutation testing were further conducted to confirm the utility of the identified region in classifying the patients.

Results: Multiple comparisons testing of rsDCE-delta and one way ANOVA show statistically significant differences between R and NR ($F=15.53$, $p=2.14*10^{-04}$). After correction for intersubject variability, rsDCE-delta in F3 provides the best combination of sensitivity (91.03%) and specificity (95.59%) for discriminating R and NR.

Conclusion relevance/implications: Resting state functional EEG connectivity DCE-delta can be used as a potential biomarker for pretreatment assessment of remission to rTMS treatment in separating MDD patients. rTMS stimulation restores the regularity of functional EEG

Poster #4. **The acute effects of a combined yoga and transcranial direct current stimulation on neurophysiological markers**

Presenter: Marlon Danilewitz | MD Psychiatry Resident

Authors: Gabrielle Chartier and D. Cawthorpe

Faculty Sponsor: Fidel Vila-Rodriguez | MD

Introduction: While previous research has documented the benefits and neurophysiology associated with yoga and meditation as well as trans Cranial Direct Current Stimulation (tDCS), there have been no studies to date explore the benefits of a combined intervention. This will be the first study to date to explore the impact of joint yoga/meditation-neurostimulation intervention.

Method: Thirty healthy volunteers who have practiced yoga twice a week for over 2 years will be randomized to receive either a yoga-tDCS intervention or a yoga-tDCS-sham intervention in a cross-over design over 2 separate days, plus a meditation-tDCS-MRI day. Pre Post measures include: EEG & Near Infrared Spectroscopy, the NBack exercise, the Toronto Mindfulness Scale.

Results: Preliminary blinded analysis data of the first 9 participants reveals a significant mean increase in the decentering facet of mindfulness pre-post intervention ($p=0.017$). Mean response time decreased pre-post intervention for all Nback trials and there was a significant decrease response time ($p=0.05$) and an increase in accuracy ($p=0.021$) for 3back.

Implications: The results are in keeping with our general hypothesis that a combined yoga-tDCS intervention would have an impact on measures of mindfulness and cognition. Preliminary findings, while modest are encouraging and warrant further exploration.

Clinical Relevance: There is a paucity of brainstimulation research to investigate the role of meditation and yoga as potential priming agents for brainstimulation. This study provides critical information into the acute neurophysiology of a joint intervention in healthy volunteers, the first step towards providing evidence in favor of benefit in clinical populations.

Poster #5. **Recovery: Well-being & Hope in the Early Stages of Bipolar Disorder**

Presenter: Taj Dhanoa | Graduate Student

Authors: Taj Dhanoa

Faculty Sponsor: Dr Lakshmi Yatham and Dr Rhea Owens | Counselling Psychology

Introduction: Bipolar Disorder (BD) can be a severe and progressive mood disorder, associated with significant morbidity. Clinical recovery from mood symptoms may not encompass complete mental health. Positive psychology asserts that other psychological constructs also have an important role to play in recovery. Examination of the constructs of well-being (Quality of Life: QoL) and hope, as well as functioning may shed more light on the recovery process in the early stages of BD Type I.

Methods: Clinical, functional and QoL outcomes were assessed over a period of three years in a First Episode of Mania (BD) cohort. The construct of hope was also assessed with this cohort. It is hypothesised that a higher number of days spent in mood episodes, particularly depression will be correlated with a lower level of QoL and functioning in the first three years of being diagnosed with BD. Lower QoL and functioning is hypothesised to be correlated with a lower level of hope in BD.

Conclusion/implications: The knowledge generated from this study will: (a) contribute to the research and therapeutic models in positive psychology for mental illness, and (b) highlight the importance

Poster #6. **n/a**

Presenter: Fawcett

Authors: Fawcett

Faculty Sponsor: n/a

Abstract: Care of patients with chronic symptoms after concussion is fragmented and inconsistent across care providers, and regions. In part, this reflects a lack of evidence-based treatments. The typical clinical post-concussion syndrome includes cognitive impairment, balance problems, sleep disturbance, dizziness, headaches, and emotional dysregulation. Only a few studies have looked at mindful based interventions for concussed patients, none of which were primarily yoga based interventions.

This mixed-methods pilot study was aimed primarily at examining the feasibility of an 8-week yoga intervention for people with post-concussion syndrome. The secondary aim was to assess the efficacy of the intervention in alleviated symptoms of post-concussion syndrome with the Rivermead Post Concussion Questionnaire, PHQ-9 (depression), GAD-7(anxiety), and salivary cortisol levels (stress levels). The Mindful Brain Yoga intervention consisted of a 60 minute beginner-level, trauma-informed hatha yoga class, three times a week for 8 weeks.

Twelve people met all the criteria and were able to commit to the study, giving us a 34% recruitment rate. Adherence was an average of 62% for completed subjects, who attended an average of 14.86 classes. Five subjects withdrew from the study due to scheduling conflicts and symptom severity, giving us a 42% attrition rate.

Average scores of symptom severity, measured by the Rivermead Post-Concussion Questionnaire, were significantly lower during the yoga intervention period than the non-yoga control period. Anxiety, depression and cortisol averages were also lower during the yoga intervention period, but did not reach significance.

Our results show potential benefits for yoga as a complementary therapy for people with post-concussion symptoms, however due to the small sample size and lack of randomized control group, further studies are needed in this area.

Poster #7.	**Differential functional connectivity of the rostral and subgenual cingulate cortex predict outcomes of treatment with rTMS for treatment-resistant depression**
Presenter:	Ruiyang Ge | Postdoctoral Research Fellow
Authors:	Ruiyang Ge, Daniel M. Blumberger, Jonathan Downar, Zafiris J. Daskalakis, Joseph C.W. Tham, Raymond Lam, Fidel Vila-Rodriguez
Faculty Sponsor:	n/a

Introduction: Repetitive transcranial magnetic stimulation (rTMS) is an effective option for treatment-resistant depression (TRD). Our aim is to investigate whether spontaneous functional circuits of subgenual cingulate cortex (sgACC) and rostral cingulate cortex (rACC) serve as biomarkers of treatment response to rTMS, and further the goal of precision prescription.

Methods: Baseline resting-state fMRI-based functional connectivity analyses using sgACC and rACC seeds were applied to fifty TRD patients who underwent 4 to 6-week courses of excitatory rTMS over left dorsolateral prefrontal cortex (DLPFC). Change rate of Hamilton Rating Scale for Depression (HRSD) score was used as a regressor of interest to identify functional connectivity that was related to depressive symptom relief. Subsequently, comparisons of these regression maps between responder and non-responder were conducted.

Results: 29 patients met response criterion (>=50% reduction on HRSD score), and 21 did not. Right DLPFC and left lateral parietal cortex (LPC) exhibited lower and higher functional connectivity with the sgACC and rACC respectively in responders compared to non-responders. sgACC-DLPFC and rACC-LPC connectivity pairs showed reversed correlation with the improvement of depressive symptoms. Receiver-operating-characteristic curves showed 84% and 76% accuracy of sgACC-DLPFC and rACC-LPC connectivity pairs in dissociating responders versus non-responders.

Conclusion: Spontaneous functional connectivity involving sgACC and rACC may serve as predictors of treatment response of rTMS to TRD patients and functional connectivity in these areas correlates to clinical symptoms.

Implications: These results have implications in guiding individualized treatment options for TRD.

Poster #8.	**Confidential Review of Suicides Within Fraser Health Mental Health and Substance Use**
Presenter:	Dr. Sharleen Gill | Psychiatry Resident, Dr. Asia Karakoc | Psychiatry Resident, Dr. Gunpreet Singh | Psychiatry Resident, Dr. Siri Reinbold | Psychiatry Resident
Authors:	Dr. Sharleen Gill, Dr. Asia Karakoc, Dr. Gunpreet Singh, Dr. Siri Reinbold
Faculty Sponsor:	Dr. Muhammad Mansoor Anwar | UBC Clinical Teaching Faculty

Introduction: There is no systematic method for reviewing suicides in Fraser Health Authority Mental Health and Substance Use (FHA MHSU). This project aims to pilot a systematic method of data collection in order to identify both organizational and service-level risk factors for suicide in FHA. A standardized approach in reviewing suicides has been useful in other jurisdictions, for example the UK National Confidential Inquiry into Suicide and Homicide (NCIH), for creating systems-level suicide reduction strategies.

Method: The sample will consist of all suicides within FHA MHSU from 2014/2015 to present, as identified by the Patient Safety Learning System, occurring in patients older than the age of 10 years. The psychiatrist and clinician most involved prior to the event will be invited to complete a standardized questionnaire adapted from the UK NCIH study. Any gaps in data will be filled by patient chart review. Descriptive statistical analysis will be completed using Stata to identify the most frequent antecedents of suicides. We expect to gather data on 100 cases.

Results/Conclusion: We have 26 completed questionnaires for which preliminary statistical analysis will be performed this month. Data collection is ongoing, and final analysis will be conducted when a significant sample size has been achieved.
Relevance/implications: This research will lead to the development of evidence-based strategies for regional suicide prevention

Poster #9. **Are Clinical Ratings of Seizure Adequacy Effective in Predicting Response in Electroconvulsive Therapy?**

Presenter: Katherine Green | Undergraduate Student

Authors: Katherine Green

Faculty Sponsor: Dr. Fidel Vila-Rodriguez

Introduction: Electroconvulsive therapy is the most effective treatment for medication refractory Major Depressive Disorder, but like all effective treatments, ECT can cause serious side effects. Because of this, physicians aim to deliver "high quality" or "adequate" seizures: seizures that produce the best possible outcomes in the fewest number of treatments. To assess seizure quality in clinical practice, physicians record and rate the quality of electroencephalograms (EEGs) collected during the seizure. The purpose of this study was to determine whether seizure adequacy assessment in clinical practice was effective in predicting response to ECT.

Methods: A retrospective chart review was performed on the charts of patients receiving distinct courses of ECT at UBC Hospital between January 2011 and May 2013. The Clinical Global Impression scale was used to assess patient clinical outcomes and multiple regressions were used to examine relationships between variables of interest.

Result: No significant relationships were found between any of the in-practice seizure adequacy measures and the patient clinical outcomes.

Conclusion: These results imply that the current practice of this seizure quality assessment system may not be effective in predicting clinical outcomes, however the reason for this lack of a relationship cannot be determined by this study.

Relevance: Physicians need a measure that can reliably give them information into seizure adequacy in order to be able to deliver the best possible treatment. However, in this study the current measures of seizure adequacy were not related to clinical outcomes, which may provide physicians with false information that could impact the safety and quality of care.

Poster #10. **Pre-season Vestibular Ocular Motor Screening (VOMS) Assessment in Young Hockey Athletes – Clinical Research**

Presenter: Monica Ho | Undergraduate Student

Authors: Monica Ho

Faculty Sponsor: Dr. William Panenka | Department of Psychiatry

Background: The Vestibular/Ocular Motor Screening (VOMS) assessment is a new screening tool that identifies concussion by measuring the magnitude that concussion-like symptoms are increased after 7 provocative visuo-motor tests: smooth pursuit, horizontal saccade (SH) and vertical saccade, near point of convergence (NPC), horizontal and vertical vestibulo-ocular reflex tests, and visual motion sensitivity challenge. Current literature defines self-reported symptom exacerbation $\geq$2 on a 10-point scale as clinically significant, suggesting possible concussion. Our study aims to establish normative VOMS data in a child athlete population and examine the effect of pre-existing psychiatric and neurological conditions on VOMS utility and metrics.

Methods: The preseason VOMS was performed on 266 healthy hockey athletes with the mean age of 11.7$\pm$2.26.

Results: VOMS internal consistency was 0.88. Children with a pre-existing headache/migraine diagnosis showed greater symptom exacerbation after Horizontal Saccade challenge (X^2=25.02, p=0.002) and Near Point Convergence ocular challenge (X^2=24.00, p=0.001). Children with a history of previous concussion are also more likely to have clinically significant symptom exacerbation after Near Point of Convergence ocular challenge (X^2=6.80, p=0.009). Pre-existing ADHD and depression had no effect on the VOMS.

Conclusion: VOMS demonstrates good internal consistency. Concussion history and pre-existing headache/migraine should be taken into account when applying the VOMS during baseline testing, and after concussion.

Poster #11.	**Initial Symptoms Among Patients Presenting at the Neuropsychiatry Concussion Clinic**
Presenter:	Jelaina Holroyd
Authors:	Jelaina Holroyd, Noah Silverberg, Delrae Fawcett, Trevor Hurwirtz, Andrew Howard, William Panenka
Faculty Sponsor:	n/a

Objective: The primary aim of this study was to describe the baseline demographic and health characteristics of patients seeking care for persistent post-concussion symptoms at the Neuropsychiatry Concussion Clinic (Detwiller Pavillion, University of British Columbia). We hypothesized that patients who were female, had a prior concussion history, and/or had a concurrent psychiatric illness would display cognitive deficits and worse somatic symptoms.

Methods: A convenience sample of patients referred to the Neuropsychiatry Concussion Clinic for endorsing symptoms weeks to years after a mTBI were administered a variety of self-report questionnaires, including psychiatric and neurological screening instruments, along with various cognitive tests. T-tests, chi square tests, and Fisher's exact tests were used as appropriate to probe associations between variables.

Results: Sex and prior head injury did not correlate with any measure examined. Patients with psychiatric illness (60.3% of the sample) rated their cognitive difficulties as more severe [$t(54)= -3.370$, $p= 0.001$], and performed worse on multiple objective cognitive tests (RAM-T: $t(33.087)= 2.868$, $p= 0.007$; B-NCA: $t(28.319)= 2.351$, $p= 0.026$; BTA: $t(36.467)= 1.987$, $p= 0.055$).

Discussion: Concurrent psychiatric illness was associated with subjective and objective cognitive impairment. Previous concussions and sex were not significantly associated with cognitive impairment, headache severity, or balance testing.

Poster #12. **Side Effects of rTMS in HFL and TBS Protocols for the Treatment of MDD**

Presenter: Afifa Humaira | Undergraduate Student

Authors: Afifa Humaira

Faculty Sponsor: Fidel Vila-Rodriguez | MD, FRCPC, FAPA. Assistant Professor.

Abstract: Repetitive Transcranial Magnetic Stimulation (rTMS) is a first-line treatment for treatment-resistant depression. Newer rTMS protocols are being developed and it is extremely important to characterize their side effect profile. Therefore, the goal of this work is to characterize and compare the side effects of two rTMS protocols, namely High Frequency Left (HFL) and Theta Burst Stimulation (TBS). To quantify the side effects of rTMS in this study, three different questionnaires were analyzed. The first one is "Treatment Confirmation," and this reports whether the participant has experienced any side effects immediately after each treatment session. The next two are "Comfort Rating Questionnaire" (CRQ) A and B, and they are two sets of questionnaires that list possible side effects with a severity scale from 1 to 10, where CRQ A is self-reported several minutes after the treatment ends, while CRQ B is self-reported hours after. Results show that headache, fatigue, and sleeping problems are the three most common side effects of rTMS, with headache being the most common side effect where 41 out of 61 patients reported to have experienced it at least once over the course of the treatment. When the severity of pain, headache and fatigue were compared in both HFL and TBS protocols, it turns out that the severity of pain was higher in TBS group (3.45 (0.66) TBS vs. 2.73 (0.77) HFL; $t = -3.889$; $p = 0.000252 < 0.05$); the severity of headache was higher in HFL group (1.85 (0.43) HFL vs. 1.41 (0.27) TBS; $t = 4.746$; $p = 0.000014 < 0.05$); and the severity of fatigue was also higher in HFL group (2.16 (0.23) HFL vs. 1.45 (0.18) TBS; $t = 13.315$; $p < 0.00001 < 0.05$). It can also be concluded that the side effects reported by the participants after rTMS treatments are transient, and that there is also a general decreasing trend overtime of these side effects.

Poster #13. **Physical pain among psychiatric outpatients: The relationship between pain location, psychiatric distress, and alexithymia**

Presenter: Megumi Iyar | Graduate Student

Authors: Megumi Iyar, Zarina Giannone, Sharon Ahn, David Kealy

Faculty Sponsor: John Ogrodniczuk | UBC Psychiatry

Introduction: Physical pain is highly prevalent among psychiatric outpatients, yet our understanding of pain presentations among such patients is poor. A key construct to consider in the context of psychic distress and physical pain is alexithymia, a trait deficit in the cognitive processing of emotional experience, such that individuals have a limited capacity to symbolize emotions and elaborate upon emotional experience. The purpose of this study was to survey psychiatric outpatients regarding location of physical pain and its association with general psychiatric distress and alexithymia.

Methods: Two hundred and seventeen patients were recruited from three Canadian outpatient psychiatry programs. Participants were surveyed about current physical pain using the Brief Pain Inventory. Participants also completed measures of psychiatric distress (Brief Symptom Inventory-18) and alexithymia (Toronto Alexithymia Scale-20).

Results/conclusion: The three most commonly reported pain locations were: lower back, head, and neck. Logistic regression analyses revealed that psychiatric distress and alexithymia differed by pain location. Lower back pain was not significantly associated with psychiatric distress or alexithymia. Neck pain was significantly associated with distress, but not with alexithymia. Finally, head pain was significantly associated with distress and alexithymia.

Conclusion/implications: The findings demonstrated that psychic distress and alexithymia differ depending on the location of one's pain. Head pain, in particular, appears to be accompanied by greater psychiatric distress and difficulty with identifying and communicating one's feelings.

Poster #14. **In influence of symptom provocation on executive function in pediatric obsessive-compulsive disorder.**

Presenter: Dr. Fern Jaspers-Fayer | Post Doctural Fellow

Authors: Fern Jaspers-Fayer, Sarah Yao Lin, Laura Belschner, Juliana Negreiros, & S. Evelyn Stewart.

Faculty Sponsor: Dr. S. Evelyn Stewart

Introduction: Pediatric obsessive-compulsive disorder (OCD) is a common and debilitating neuropsychiatric illness, characterized by intrusive thoughts and repetitive behaviors. Previous behavioral studies have shown OCD is associated with executive function impairments on planning tasks, particularly during high task-load trials.
Although clinicians working with OCD-affected youth often report that symptom provocation can negatively influence executive function, this detrimental interaction has almost never been tested in the lab.

Methods: OCD-affected youth (n = 27; age = 15.07, SD = 2.65; 44% male) were recruited through the BC Children's Hospital Provincial OCD Program (BCCH-POP), and compared to a group of healthy control participants (n = 26; age = 14.58, SD =2.87; 42% male) recruited through community advertisements. Groups were then compared on a standard planning task, the Tower of London (ToL), before and after OCD symptom provocation.

Results: Before OCD symptom provocation there were no significant differences in response time (RT) between groups on low or high task load trials [$t(51) = 1.402$, $p = 0.167$ and $t(51) = 1.443$, $p = 0.155$, respectively]. After OCD symptom provocation, groups exhibited a significant difference during high task load trials, $t(51) = 2.09$, $p = 0.042$, but continued to perform at par with the healthy controls during low task load trials, $t(51) = 1.222$, $p = 0.227$. There were no significant differences between groups in accuracy, $F(51) = 1.440$, $p = 0.236$.

Discussion: This is the first study to report that symptom provocation can directly impact executive function in pediatric OCD. Work completed by functional magnetic resonance imaging (fMRI) researchers suggests that OCD is underpinned by a dysfunctional cortico-striato-thalamico-cortico (CSTC) network with poorly interfacing affective (e.g., ventromedial) and cognitive (e.g., dorsolateral) loops, but this has never been tested directly. Future work should determine if this paradigm can be used to elucidate the CSTC.

Poster #15. **Experiences in Emergency Room settings Among People Who Use Drugs in Vancouver, Canada: A Qualitative Study**

Presenter: Dr. Verena Langheimer | PGY-4 Psychiatry Resident and Goldcorp Addiction Medicine Fellow

Authors: Langheimer V, Kerr T, Wood E, Small W, McNeil R.

Faculty Sponsor: Dr. Ryan McNeil | Department of Medicine, UBC

Introduction: To explore contextual influences on the perceptions and experiences of structurally vulnerable people who use drugs (PWUD) in relation to emergency department settings, and their impact on hospital outcomes.

Methods: Semi-structured qualitative interviews were conducted with thirty structurally vulnerable PWUD who had been discharged from hospital against medical advice within the past two years as part of a larger study on hospital care and drug use in Vancouver, Canada. In-depth interviews elicited perceptions regarding hospital care and experiences in hospital settings among PWUD, with an emphasis on social-structural influences on access to and retention in hospital care, Data were analyzed thematically and interpreted by drawing on concepts of social violence.

Results: Our findings demonstrate how experiences and perceptions of social violence operating within emergency department settings drive adverse experiences among PWUD, including (1) perceived differential treatment and discrimination stemming from the stigmatization of PWUD; (2) inadequate pain and symptom management due to the lack of patient-centeredness (e.g., tailored approaches for patients who are not responding well to guideline-based pain treatment approaches) for drug-using populations; (3) perceptions of neglect and inadequate management of acute health needs; and, (4) lack of patients' agency and autonomy in care, leading to conflict with health personnel.

Implications: Findings demonstrate the need to address underlying societal conditions that contribute to negative perceptions and adverse outcomes among PWUD, including stigma and current care approaches, to improve emergency department care for structurally vulnerable PWUD and thus improve health equity.

Poster #16. **Potential biases in design when assessing Pediatric Obsessive-Compulsive Disorder (OCD)'s academic functioning**

Presenter: Juliana Negreiros | Postdoctoral Fellow, Laura Belschner | Research Coordinator, Sarah Lin | Research Coordinator, S. Evelyn Stewart | MD Associate Professor

Authors: Juliana Negreiros, Laura Belschner, Sarah Lin, S. Evelyn Stewart

Faculty Sponsor: Dr. S. Evelyn Stewart | MD, UBC Department of Psychiatry

Introduction: OCD-affected youth face challenges at school that may result in school avoidance, school refusal, and academic underperformance. Anecdotally, causes for school difficulties have been reportedly related to OCD symptoms and their associated distractions, in addition to cognitive dysfunction.

Objective: To objectively assess academic functioning by comparing OCD-affected youth with healthy controls (HC).

Methods: Academic functioning was assessed using the *KTEA-3 Brief* standardized measure in 21 OCD-affected youth and 21 HC matched by age, gender, IQ, and +/- ethnicity. To examine group differences, independent t-test analyses were performed ($p<0.05$). Correlations between academic functioning and OCD symptom severity were also examined.

Results: In comparison to the predominantly Asian HC group, OCD-affected youth scored significantly lower in math calculation ($p=0.014$) when the sample was *not* matched by ethnicity. However, such group difference disappeared when ethnicity was accounted for ($p=0.118$). Academic performance in reading, math, and writing was not associated with symptom severity in the OCD group.

Conclusions: The present study is amongst the first to examine academic functioning in pediatric OCD via standardized testing. The variable findings regarding ethnicity highlight the importance of considering potential biases in research design, and suggest that larger samples may be required to avoid spurious results.

Poster #17.	**Investigating epigenetic mechanisms of heritability and treatment response in Obsessive-Compulsive Disorder**
Presenter:	Andrew Perrin | Resident 4
Authors:	Andrew Perrin
Faculty Sponsor:	Dr. S. Evelyn Stewart | MD, UBC Department of Psychiatry

Introduction: Obsessive-compulsive disorder (OCD) affects 1-2% of all children. Despite a high heritability, genome-wide association studies have yet to identify replicable OCD susceptibility loci. This raises the possibility that sequence-independent means of heritability, such as epigenetic modifications, are important contributors to OCD pathophysiology. Dynamic changes in these same epigenetic modifications may also be an important underlying mechanism through which Cognitive Behavioral Therapy (CBT) exerts its treatment effect in OCD. To investigate this we will undertake genome-wide DNA methylation (DNAm) profiling in children and adolescents with OCD to identify important disease susceptibility loci. We will then determine whether any identified DNAm loci can be used to predict disease severity or responsiveness to treatment with CBT.

Methods: Buccal swabs are obtained from children and adolescents (aged 6-18). We will examine epigenome-wide DNAm profiles both prior to and after finishing CBT for OCD. DNAm profiles from affected youth will be compared with DNAm profiles from age- and time-matched controls to identify any differentially methylated loci. Changes in DNAm over the course of CBT will be correlated with changes in disease severity scores over the same interval to identify DNAm loci that can predict disease severity or responsiveness to CBT.

Results/Conclusion: We are currently collecting samples.

Poster #18. **Trauma-Related Conversations on Twitter: A thematic analysis of social media discussions around PTSD and trauma**

Presenter: Abnashi Singh Randhawa | Undergraduate

Authors: Abnashi Singh Randhawa

Faculty Sponsor: Dr. Michael Krausz | UBC Vancouver Campus

Introduction: Twitter has been identified as an effective tool for hosting discussions about mental illness. However, there is limited literature on the use of Twitter among youth for discussions specifically about post-traumatic stress disorder (PTSD) and trauma. To understand the nature of support and content provided on Twitter specific to PTSD and trauma we report on the total tweets, and the proportion of each type of conversation (support, engagement, informational) tweeted by the identified accounts.

Methods: Using the Twitter Archiving Google Spreadsheet tool, we collected tweets that used specific hashtags. The first 30 tweets that included #PTSD or #trauma were collected from each account and coded into categories: support, engagement, informational.

Results: Tweets were collected from 53 accounts. At each time point (baseline, follow-up) 1590 tweets were assessed. The proportion of tweets in each category were as follows (average values): 34.3% (support), 4.4% (engagement), 38.7% (informational).

Conclusion: Twitter is currently not as valuable a resource for interactive peer-to-peer support (due to minimal engagement type conversations), but a useful environment for obtaining information and supportive comments about PTSD and trauma.

Poster #19. **Paternal Postpartum Depression: A Review of the Literature**

Presenter: Isabel Sadowski | Research Assistant

Authors: Isabel Sadowski

Faculty Sponsor: Dr. Shaila Misri, Clinical Professor, UBC Psychiatry

Introduction: Maternal postpartum depression (PPD), a widely recognized mental health issue, has a prevalence rate of 13%. However, its occurrence in new fathers is under-acknowledged; therefore it is underdiagnosed/undertreated. This exploratory literature review examines available articles on the epidemiology, clinical features, risk factors, and treatment of paternal PPD.

Methods: Using PubMed, Google Scholar, PsycINFO, and UBC Library, peer-reviewed scientific literature on paternal PPD was searched for and synthesized. Recent, relevant publications were included, despite paucity of literature.

Results: Literature search identified 26 pertinent articles. Paternal PPD's overall clinical picture presents similarly to MDD with peripartum onset in mothers. However, research shows that specific issues in clinical manifestation, with some symptom specificity, appear to occur during the postpartum period for fathers. Currently, no research or clinical guidelines exist for the treatment of paternal PPD, although certain psychotherapeutic interventions appear to be promising.

Conclusion: Despite equal prevalence of paternal and maternal PPD, fathers' mental health needs appear to be unaddressed. Timely intervention in a sensitive manner with paternal PPD will reduce stigma/barriers and ensure treatment.

Poster #20.	**Feasibility of a Mindfulness-Based Cognitive Therapy Group Intervention as an Adjunctive Treatment for Postpartum Depression and Anxiety**
Presenter:	Genevieve Breau | Research Assistant Isabel Sadowski | Research Assistant
Authors:	Genevieve Breau, Isabel Sadowski
Faculty Sponsor:	Dr. Shaila Misri | Clinical Professor

Introduction: Women experiencing moderate to severe mood and anxiety disorders in the postpartum period may not achieve complete symptom remission with pharmacotherapy. This study evaluated the feasibility of an eight-week mindfulness-based cognitive therapy (MBCT) intervention as an adjunctive treatment for women experiencing residual postpartum depression/anxiety.

Methods: Women were recruited at an outpatient reproductive mental health clinic based at a maternity hospital. Participants had a diagnosis of postpartum depression/anxiety within the first twelve months after childbirth. They were enrolled to either the MBCT intervention group (n=14) or a control group (n=16). All participants completed the Generalized Anxiety Disorder-7 (GAD-7) questionnaire, the Patient Health Questionnaire-9 (PHQ-9), and the Mindfulness Attention Awareness Scale (MAAS) at baseline, 4 weeks, 8 weeks, and 3 months.

Results: Mixed between-within subjects Analyses of Variance (ANOVAs) demonstrated that the MBCT intervention had the effect of decreasing depression and anxiety levels in the MBCT group. These changes were not found in the control group.

Conclusions: MBCT has potential as an adjunctive, non-pharmacological treatment for women experiencing residual postpartum depression and anxiety.

Poster #21. **Parent tolerance of child distress in pediatric obsessive-compulsive disorder: Correlates and relationship with treatment outcomes**

Presenter: Robert Selles | Postdoctoral Fellow

Authors: Robert Selles , Laura Belschner, Sarah Lin, Katherine McKenney, Annie Simpson, Noel Gregorowski,

Faculty Sponsor: Dr. S. Evelyn Stewart | MD, UBC Department of Psychiatry

Introduction: Poor parental tolerance of child distress may impact outcomes of cognitive-behavioral treatment (CBT) for pediatric OCD; however, only one study has examined this construct.

Methods: Parents of youth with OCD completed measures at an initial assessment (n = 84) and pre-post CBT (n = 51). The Parent Tolerance of Child Distress scale (PT-OCD) was the primary outcome measure.

Results: Better tolerance in parents correlated with less family impairment (r=-.38, -.39), as well as with parental efficacy for mothers (r=.31) and coercive/disruptive behavior for fathers (r=-.32). Over treatment, small improvements in distress tolerance were made by mothers (d=.32) and large improvements by fathers (d = 0.72). For fathers but not mothers, poor initial tolerance was associated with larger improvements in overall severity (r = .31) and family functioning (r=.58). Improvements in tolerance also correlated with better family functioning for mothers and fathers (r=-.36, -.37), and for fathers with greater improvements in overall severity (r=-.46).

Conclusion: Parental tolerance is associated with important clinical factors and treatment outcome in youth with OCD.

Poster #22.	**WalkAlong: process evaluation of an online mental health portal using Google Analytics**
Presenter:	Michael Jae Song MPH | Intern
Authors:	Michael Jae Song MPH, Fiona Choi PhD, Mohammadali Nikoo MD, John Ward PhD
Faculty Sponsor:	Dr. Michael Krausz | UBC Department of Psychiatry

Introduction: WalkAlong is an online youth mental health portal that includes self-assessment and monitoring, self-help exercises, and information about mental health. This evaluation study uses Google Analytics to inform the improvement strategy of WalkAlong.

Methods: Google Analytics was used to monitor online user activity during WalkAlong's first year of operation (Nov. 13 2013 – Nov. 13 2014). User behaviour based on the device used, new and returning users, depth and length of average sessions, and visits to individual pages were observed.

Results: The majority of visitors were desktop users (82.3%) with a longer average session duration (5m 43s) compared to smartphones (1m 53s). Returning users had longer session duration (7m 54s) than new users (3m 04s). Users spent longer time on the screener tool (3m 04s) than the self-help exercises (1m 08s).

Conclusions: Future improvement for WalkAlong should improve mobile accessibility, engage new users, and engage users more with self-help exercises.

Clinical Relevance: High attrition rates remain to be problems for online mental health interventions. Google Analytics can play a vital role in highlighting the preference of those using e-mental health tools. Using this tool can help identifying ways of improving engagement and effectiveness of online mental health tools.

Poster #23. **Metabolic and Genetic Explorations in Refractory Schizophrenia Project – chromosomal variants in 1st 10 cases**

Presenter: Robert Stowe | Faculty

Authors: Robert Stowe

Faculty Sponsor: n/a

Introduction: Copy number variants (CNVs, chromosomal deletions and duplications) contribute significantly to schizophrenia risk. Here we present pilot data from chromosomal microarray screening (CMA) conducted in the 1st 10 participants with treatment-resistant psychosis (TRP) from the MAGERS research project.

Methods: CMA was performed using a high-resolution cytogenetics-optimized SNP array (Affymetrix Cytoscan HD). CNVs called by Chromosomal Analysis Suite software containing ≥ 25 probes were manually curated for reliability and annotated by a clinical cytogeneticist, based on Database of Genomic Variants (DGV) and DECIPHER overlap, gene content, and literature review.

Results: Using ACMGG reporting guidelines and thresholds (200 Kb deletion/400 Kb duplications). four variants of unknown significance were found: duplications at 22q11.2, 15q13.3 (overlapping CHRNA7); and Xp22.33 (overlapping SHOX); and a 1p11.2-12.2 deletion (overlapping NOTCH2). With size filters relaxed, 17 more relevant CNVs were identified, impacting two potential new candidate genes (DENND2A and MAGEE1), and six previously implicated in schizophrenia: four associated with synaptic function (SHANK3, NLGN1, ERBB4, and GPRIN2) and two involved in immune function (CSF2RA and IL3RA).

Conclusion: The diagnostic yield of CMA in TRP is significant, particularly when smaller variants are considered.

Poster #24.	**A Novel Approach to Treating Somatization in Youth: Clinical Outcomes after the Mind-Body Connection Program**
Presenter:	Jennifer Pooni, BSc & Reghan Strutt, BSc
Authors:	Jennifer Pooni, Reghan Strutt
Faculty Sponsor:	Amrit Dhariwal, PhD RPsych

Introduction: Somatization pertains to mental health conditions presenting as disabling physical symptoms, leading to confusion and frustration for patients and healthcare providers. There are limited evidence-based resources for somatizing youth and families, most of which overlook the role of emotions. The Mind-Body Connection (MBC) is a novel program designed to gently introduce families to the emotional factors involved in somatization. The purpose of this study was to determine if MBC participation is associated with improvements in symptoms, functioning, emotion regulation, readiness for non-medical management strategies, and parent-child attachments.

Methods: Physician-referred somatizing youth (n=27, 70% girls) and their caregivers attended MBC, delivered in group format over 6 weeks by mental health clinicians. Validated self-report questionnaires completed before and after MBC were used to assess target variables.

Results: A repeated-measures MANOVA showed group participation was linked with improvements in: somatic symptoms (d=.49), functional disabilities (d=.47), readiness for non-medical management (d=.56), and emotional expression (d=.32). Participation was not linked with changes in emotional suppression/disinhibition or the parent- child attachment.

Conclusion: Learning to attend to emotions through programs like MBC may help somatizing youth begin their path to recovery.

Implications: A controlled trial that addresses long-term maintenance of gains and mechanisms of change is warranted.

Poster #25. **Working Memory Load Increases the Diagnostic Utility of Smooth Pursuit in mTBI**

Presenter: Jacob Stubbs | Student with Panenka Research Group

Authors: Jacob Stubbs

Faculty Sponsor: Dr. William Panenka, Dept. of Psychiatry

Introduction: Despite some promising eye movement research, no objective diagnostic paradigm has been developed to diagnose mTBI. We hypothesized that combining Working Memory load and smooth pursuit eye movement would provide a higher degree of diagnostic discrimination between patients and controls than either alone.

Methods: 16 mTBI patients and 13 control participants followed a target on a circular trajectory, and two levels of additional WM load were added in some trials. Eye movement was tracked using infrared video-oculography.

Results: Significant differences were found in smooth pursuit between mTBI participants and healthy controls across all levels of WM load. Low WM load significantly improves the tracking of mTBI patients ($p < 0.01$). High WM load has no effect on mTBI pursuit but significantly improves pursuit in controls ($p < 0.01$). A receiver operator characteristic shows an area under the curve of 0.78 for baseline pursuit, 0.70 for 1-back pursuit, and 0.89 for 2-back pursuit pursuit.

Conclusion: The preliminary results indicate that pursuit with a high amount of additional WM load is a more sensitive diagnostic paradigm of mTBI than eye tracking alone.

Implications: A dual-task paradigm with a combined WM and smooth pursuit task may be more sensitive to mTBI than single-criteron diagnostics.

Poster #26. Machine Learning Predicts Response to rTMS in Depression

Presenter: Jenny Yang | Undergraduate Student

Authors: Jenny Yang

Faculty Sponsor: Dr. Fidel Vila-Rodriguez | Assistant Professor

Introduction: Efficacy rates of Transcranial Magnetic Stimulation (TMS) are in the range of 50-55% response, and rTMS has become a first-line treatment for treatment-resistant depression. However, efforts to predict treatment response are underway, using a variety of neuroimaging, physiological parameters. Our goal was to investigate the predictive features of detailed symptom profiles in TRD.

Methods: 62 patients with TRD were recruited and assessed with the Hamilton Rating Scale for Depression (HRSD) and the Inventory of Depressive Symptomatology (IDS). We reduced the dimensionalities of these scales to a smaller feature set through the use of crosstabs and conditional box plots. We then applied 4 methods of supervised machine learning to further understand how these variables interact and combine, in order to predict response to rTMS treatment.

Results: Due to the stochastic nature of these algorithms, we found that the models showed accuracies of 65% to 75% when using the HRSD and accuracies of 75% and 85% when using the IDS, with Kappa values ranging from 0.1 to 0.5, at 0.95 confidence levels.

Discussion: Features within the IDS show higher accuracy power to predict treatment response to rTMS compared to the HRSD. Furthermore, using exclusively features from clinical scales yields similar accuracy to those demonstrated by means of fMRI, EEG, or several omics. Our data highlight the relevance of clinical features in predicting outcomes, and the need to not abandon accurate and detailed psychopathological assessments.

Poster #27. **The Rate of Death by Suicide in Medical Students: A Systematic Literature Review**

Presenter: Rebecca Zivanovic | PGY1, Psychiatry, Research Track

Authors: Rebecca Zivanovic, Dr Christina Roston

Faculty Sponsor: n/a

Introduction: Medical students experience high rates of psychological distress, depression and suicidal ideation. Our primary objective was to conduct a systematic review of the literature for reported rates of completed suicide in medical students.

Methods: We conducted a literature search using Medline, Embase, Psycinfo and CINAHL from database inclusion dates to Aug 31, 2016. Any primary literature reporting prevalence, incidence or rate of medical student suicide as an outcome was included.

Results: We ultimately included 7 studies, from three countries which all reported a rate of suicide in medical student populations at various time periods between 1879 and 2011. Rates of suicide among medical students ranged between 0 and 39.6/100,000. Six studies compared their suicide rates to a current population based statistic. One of these found the rate to be comparable, three found the rate to be higher and two found it lower than expected, based on population data.

Conclusions: There is no consensus as to whether the suicide rate in medical students is above or below what would be expected for their age-matched population.

Implications: Our results emphasize the need for further prospective research into medical student suicide if we are to design and implement meaningful suicide prevention strategies.