At the end of the meeting, participants should be able to:

- Review cognitive, psychiatric and psychosocial issues important in epilepsy.
- Identify different approaches to challenging cases in epilepsy surgery.
- Discuss the utilization of epilepsy surgery.
- Review basic and clinical pharmacology of the newer anti-seizure drugs.
- Review common neuropathological lesions that cause seizures.
- Review personalized therapy of epilepsy.
- Review potential mechanisms underlying SUDEP.
- Review stereotactic and ablative surgery in epilepsy.
- Review pre- and post-surgical diagnostic imaging in epilepsy.
- Review infantile spasms.
- Review women and epilepsy.
- Review parietal lobe epilepsy.

Friday, October 13, 2017

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>4:00 p.m.</td>
<td>Conference Registration and Exhibits</td>
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<tr>
<td>5:00 p.m.</td>
<td>CLAE Annual General Meeting</td>
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<td></td>
<td>Members Only</td>
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<tr>
<td>6:00 p.m.</td>
<td>Welcome + Presidential Lecture</td>
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<td>Dr. Jorge Burneo, Western University, CLAE President</td>
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<tr>
<td>6:30 p.m.</td>
<td>Canadian EPILEPSY Alliance / Alliance canadienne de L’EPILEPSIE</td>
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<tr>
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<td>Successes of the Past and Challenges in the Future</td>
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<td>CEA Board Members</td>
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<tr>
<td>7:00 p.m.</td>
<td>Keynote Speaker</td>
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<tr>
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<td>Negative Impact of Psychiatric Comorbidities on the Course and the</td>
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<td></td>
<td>Pharmacologic and Surgical Treatments of Epilepsy</td>
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<td></td>
<td>Dr. Andres Kanner, University of Miami</td>
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<td></td>
<td>Chair: Dr. Paolo Federico, University of Calgary</td>
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</table>

Learning Objectives:
- Will be able to recognize the association of a history of psychiatric comorbidities preceding the onset of epilepsy on the risk of developing treatment-resistant epilepsy.
### PROGRAM

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 p.m.</td>
<td>Wrap-up for the Day</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>Welcome and Introductions Dr. Paolo Federico, University of Calgary</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>Acting Your Age: How Do Cognition and Social Skills Impact Adaptive Functioning in Pediatric Epilepsy Dr. Elizabeth Kerr, The Hospital for Sick Children</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>All Grown Up: Social Outcomes After Pediatric Epilepsy Surgery Dr. Mary Lou Smith, The Hospital for Sick Children</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>Food for Thought: Obesity and Epilepsy Dr. Marilyn Jones-Gotman, McGill University</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>A New Link: Medial Temporal Lobe ‘Hyper-Excitability’ and Alzheimer’s Disease Dr. Mary Pat McAndrews, University of Toronto</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>Break and Exhibits</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>Breakout Sessions</td>
</tr>
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</table>

- Will be able to identify patients at risk for the development of iatrogenic psychiatric adverse events associated with pharmacotherapy and epilepsy surgery.
- Will be able to understand the pathogenic mechanisms that may explain the negative impact of psychiatric comorbidities on the course of epilepsy.

### Saturday, October 14, 2017

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30 a.m.</td>
<td>CLAE Fun Run/Walk Join us for the 2nd CLAE Fun Run/Walk! Meet at 6:15 a.m. in the lobby of the Pinnacle Hotel Harbourfront</td>
</tr>
<tr>
<td>7:30 a.m.</td>
<td>Registration and Breakfast</td>
</tr>
<tr>
<td>8:25 a.m.</td>
<td>Welcome and Introductions Dr. Paolo Federico, University of Calgary</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td>New Questions in the Neuropsychology of Epilepsy Chair: Dr. Mary Pat McAndrews, University of Toronto</td>
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<tr>
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<td>Learning Objectives:</td>
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<tr>
<td></td>
<td>- Learn about the cognitive and social factors associated with adaptive function in children with epilepsy.</td>
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<td></td>
<td>- Understand the impact of childhood epilepsy surgery on the later development and attainment of psychosocial and vocational milestones.</td>
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<td>- Identify abnormalities in cognition and brain structure in relation to obesity and epilepsy.</td>
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<td>- Learn about a new hypothesis regarding epileptiform activity in the medial temporal lobe and progression of age-related memory decline to Alzheimer’s Disease.</td>
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<tr>
<td>10:15 a.m.</td>
<td>Break and Exhibits</td>
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</tbody>
</table>

**CLAE 2017 Scientific Meeting | October 13-15, 2017**
| Session 1-A | **Personalized Therapy of Epilepsy: Where are we in 2017?**  
Chair: Dr. Kathy Speechley, Western University |
|---|---|
| Learning Objectives:  
- Review gene discovery in epilepsy and integration in clinical practice.  
- Review screening for new therapies using a zebra fish model.  
- Review the impact of early diagnosis and treatment on health related quality of life and psychiatric comorbidity. |
| Target Audience:  
Epileptologists, residents, fellows, nurses, psychologists. |
| Topics and Speakers:  
**Integration Of Next Generation Sequencing Into Clinical Care**  
Dr. Michelle Demos, University of British Columbia  
**Screening For New Anti-Seizure Therapies Using High Throughput Sequencing In A Zebra Fish Model**  
Dr. Deborah Kurrasch, University of Calgary  
**Targeted Therapies In Epilepsy (Includes Case Presentations)**  
Dr. Mary Connolly, University of British Columbia  
**Determinants Of Quality Of Life And Psychiatric Comorbidity In Epilepsy In Children**  
Dr. Mary Lou Smith, University of Toronto |

| Session 1-B | **Stereotactic Ablative Techniques in Epilepsy Surgery**  
Chair: Dr. David A. Steven, Western University |
|---|---|
| Learning Objectives:  
- Review the different types of stereotactic lesioning techniques for epilepsy surgery.  
- Review the indications for stereotactic lesioning techniques for epilepsy surgery.  
- Review the effectiveness of stereotactic lesioning techniques for epilepsy surgery.  
- Review the risks and limitations of stereotactic lesioning techniques for epilepsy surgery. |
| Target Audience:  
Neurosurgeons, neurologists, nurses, and allied health care providers. |
| Topics and Speakers:  
**History Of Stereotactic Ablative Techniques For Epilepsy**  
Dr. Andrew Parrent, Western University  
**Stereotactic Radiosurgery And High-Intensity Focused Ultrasound Ablative Techniques For Epilepsy** |
| Session 1-C | Brainstem Seizures: Implications for Autonomic Dysfunction and SUDEP  
Chair: Dr. G. Campbell Teskey, University of Calgary  
Learning Objectives:  
- Review brainstem seizures.  
- Review the relationship between brainstem seizures and autonomic dysfunction.  
- Review modelling of sudden unexpected death in epilepsy in rodents.  
- Review potential interventions and the possibility for their translation to the clinic.  
Target Audience:  
Epileptologists, scientists, neurophysiologists, imagers, students.  
Topics and Speakers:  
Brainstem Hypoxia Following Forebrain Seizures Is Linked To Apnea Followed By Asystole In A Mouse Model Of SUDEP  
Dr. G. Campbell Teskey, University of Calgary  
Brainstem Seizures In A Rat Model Of Acute Recurrent Hippocampal-Originating Seizures: Apnea, Cardiac Suppression, And Clinical Relevance  
Dr. Peter Carlen, University of Toronto  
Visualizing Spreading Depression During Fatal And Non-Fatal Seizures  
Dr. Stuart Cain, University of British Columbia |
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<tbody>
<tr>
<td>12:30 p.m. Harbourfront Foyer</td>
<td>Lunch and Exhibits</td>
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<tr>
<td>12:45 p.m. Harbourfront Ballroom 3</td>
<td>Poster Tour</td>
</tr>
</tbody>
</table>
| 1:45 p.m. | Top Trainee Abstract Presentations  
Chair: Dr. Paolo Federico, University of Calgary  
Learning Objectives:  
- Appraise recent research projects in epilepsy.  
- Develop critical thinking on results of research projects.  
- Discuss the implications of recent research projects on current clinical practice in epilepsy.  
1. Is the Hemodynamic Response to Scalp Interictal Epileptic Discharges the Onset Zone of Intracerebral Interictal Discharges?  
Hui Ming Khoo, Montreal Neurological Institute and Hospital |
<table>
<thead>
<tr>
<th>Session</th>
<th>Breakout Sessions</th>
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<tbody>
<tr>
<td>3:00 p.m.</td>
<td>Breakout Sessions</td>
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</tbody>
</table>
| Session 2-A | Basic and Clinical Pharmacology of Newer Anti-Seizure Drugs  
Chair: Dr. Jong M. Rho, University of Calgary |

**Learning Objectives:**
- Review the fundamental mechanisms through which six newer anti-seizure drugs (ASDs) exert their clinical effects.
- Review the major drug interactions that could occur when newer ASDs are used in combination, or with other non-epilepsy medications.
- Review the pivotal clinical trials that led to regulatory approval of newer ASDs.
- To describe both common and rare adverse side-effects of newer ASDs.
- To critically assess whether mechanisms of action matter with regard to clinical use of ASDs in general.

**Target Audience:**
Neurologists, neurosurgeons.

**Topics and Speakers:**

**Mechanistic Overview of Anti-Seizure Drugs**  
Dr. Tara Klassen, University of British Columbia

**Pharmacokinetic Profiles of Newer Anti-Seizure Drugs**  
Dr. Jong M. Rho, University of Calgary

**Clinical Efficacy of Newer Anti-Seizure Drugs**  
Dr. Jorge Burneo, Western University

**Adverse Effect Profiles of Newer Anti-Seizure Drugs**  
Dr. Lionel Carmant, Université de Montréal

| Session 2-B | Pre and Post-Surgical Neuroimaging Diagnostics in Childhood and Adult Epilepsy  
Chairs: Dr. Boris Bernhardt, McGill University |

**Learning Objectives:**
- Review neuroimaging studies in children with drug-resistant epilepsies
| Session 2-C | 175 Years of Riding West: Working Towards a Better Understanding of Infantile Spasms  
| Chairs: Dr. Morris H. Scantlebury, University of Calgary and Dr. Lionel Carmant, Université de Montréal |
| --- | --- |
| Learning Objectives: | Review infantile spasms - clinical semiology, EEG and treatment options.  
Review the mechanisms of infantile spasms in light of advances in the development of rodent models and genetics.  
Discuss the developmental outcome of patients with infantile spasms and its management.  
Discuss how consensus guidelines, large databases, internet connectivity and shared data influence treatment decisions and outcomes in patients with infantile spasms. |
| Target Audience: | Neurologists, pediatricians, clinical neurophysiologists and allied health providers. |
| Topics and Speakers: | Infantile Spasms: Clinical Overview  
Dr. Peter Camfield and Dr. Carol Camfield, Dalhousie University  
Neurodevelopmental Outcome in Infantile Spasms: are we Making a Difference?  
Dr. Lionel Carmant, Université de Montréal  
Rodent Models of Infantile Spasms and the Hunt for new Treatments  
Dr. Morris Scantlebury, University of Calgary |

Program:

- Review functional and structural network analyses in patients with epilepsy  
- Relate imaging markers to SEEG and guidelines for effective ex-vivo/in-vivo studies

Target Audience:  
Students, researchers, clinicians.

Topics and Speakers:

Lesion Detection In Children And Adults With Drug-Resistant Seizures Based On Structural Imaging  
Dr. Dewi Schrader, University of British Columbia

Functional Network Analysis In Epileptic Children Using Multimodal Imaging, SEEG, And Surgical Pathology  
Dr. Roy Dudley, McGill University

Integrating In-Vivo, Ex-Vivo MRI and Histology In Patients Undergoing Epilepsy Surgery  
Deepak Toor, Western University

Connectome Analysis In Epilepsy  
Dr. Boris Bernhardt, McGill University
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<th>Time</th>
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<tbody>
<tr>
<td>4:45 p.m.</td>
<td>Break and Exhibits</td>
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<tr>
<td>5:00 p.m. (ends at 6:45 p.m.)</td>
<td>Breakout Sessions</td>
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<tr>
<td><strong>Session 3-A</strong></td>
<td><strong>Neuro-Intensive Monitoring</strong></td>
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<td>Chair: Dr. Juan Pablo Appendino, University of Calgary</td>
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<td>Learning Objectives:</td>
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<tr>
<td></td>
<td>• Identify seizures and patterns of uncertain clinical significance on regular EEG trace.</td>
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<td>• Assess new tools available for long term monitoring, in particular trends.</td>
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<td>• Recognize the difficulties and challenges to record prolonged EEGs in ICU settings.</td>
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<td>• Determine whether a questionable finding is artefactual or not.</td>
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<td>Target Audience:</td>
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<tr>
<td></td>
<td>Physicians, nurses, neurophysiologist and EEG Technologists.</td>
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<td>Topics and Speakers:</td>
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<tr>
<td></td>
<td><strong>Seizure Recognition and Patterns of Uncertain Clinical Significance in ICU: What is the New Trend?</strong></td>
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<td></td>
<td>Dr. Juan Pablo Appendino, University of Calgary</td>
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<tr>
<td></td>
<td><strong>Is it Real or an Artifact? The Challenges of ICU Recording</strong></td>
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<td>Susan McGregor, Foothills Medical Centre</td>
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<tr>
<td><strong>Session 3-B</strong></td>
<td><strong>The Utilization of Epilepsy Surgery: Potential Gaps and Future Directions</strong></td>
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<td>Chair: Dr. Mark Keezer, Université de Montréal</td>
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<td>Learning Objectives:</td>
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<td></td>
<td>• Review the evidence for the underutilization of epilepsy surgery.</td>
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<td>• Interpret preliminary results of the 2016 National Epilepsy Surgery Survey, a nation-wide audit of epilepsy surgery.</td>
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<td>• Review barriers to ready-access to epilepsy surgery and present strategies to improve this access.</td>
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<td>• Review the recently-launched Ontario Comprehensive Epilepsy Care program.</td>
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<td>Target Audience:</td>
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<tr>
<td></td>
<td>Neurologists, epileptologists, epilepsy surgeons, and allied health providers.</td>
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### Session 3-C: Women and Epilepsy

**Chair:** Karen Legg, QEII Health Sciences Centre

**Learning Objectives:**
- Demonstrate competence in recommending an appropriate anti-seizure medication for teenage girls and young women and with how to optimize vitamin supplementation in women of childbearing age with epilepsy.
- Review interactions between anti-seizure medications and oral contraceptives and awareness about birth control recommendations for women with epilepsy.
- Review aspects of managing epilepsy in pregnancy and counselling pregnant women with epilepsy.

**Target Audience:**
Neurologists, nurses, and allied health care providers caring for women with epilepsy.

**Topics and Speakers:**

**Optimizing AED Selection and Vitamin Supplementation in Teenagers Girls and Young Women**
Dr. Anita Datta, University of British Columbia

**Birth Control and AEDs**
Elaine Wong, Children’s and Women’s Health Centre of British Columbia

**Prenatal, Pregnancy and Postpartum Medication Management**
Dr. Kristin Ikeda, Dalhousie University

**Counselling Women with Epilepsy in Pregnancy**
Jessica Rieckmann, University of Alberta

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### CLAE Reception and Gala Dinner: 40th Anniversary
(Tickets must be purchased in advance)
### Sunday, October 15, 2017

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>7:30 a.m.</td>
<td>Breakfast</td>
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<tr>
<td>8:30 a.m.</td>
<td><strong>Challenging Topics in Epilepsy Surgery</strong></td>
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<tr>
<td></td>
<td>Chair: Dr. Matthew Wheatley, University of Alberta</td>
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<td></td>
<td><strong>Topics and Speakers:</strong></td>
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<td><strong>Bitemporal Epilepsy</strong></td>
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<td>Dr. Yahya Agha-Khani, University of Calgary</td>
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<td><strong>Insular Epilepsy</strong></td>
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<td>Dr. Dang Khoa Nguyen, Université de Montréal</td>
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<td><strong>Late Recurrence After Surgery - Antiepileptic Drug Withdrawal</strong></td>
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<td>Dr. Samuel Wiebe, University of Calgary</td>
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<td><strong>Cognitive or Memory Decline After Surgery</strong></td>
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<td>Dr. Mary Pat McAndrews, University of Toronto</td>
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<tr>
<td>10:15 a.m.</td>
<td>Break and Exhibits</td>
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<tr>
<td>10:45 a.m.</td>
<td>Breakout Sessions</td>
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<tr>
<td>Session 4-A</td>
<td><strong>Neuropathology of Epilepsy</strong></td>
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<td>Chair: Dr. Harvey B. Sarnat, University of Calgary</td>
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<td><strong>Learning Objectives:</strong></td>
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<tr>
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<td>- Review the range of neuropathological lesions that might be</td>
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<td>demonstrated in resected brain tissues in the surgical treatment of</td>
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<td>focal epilepsy, including both classical focal cortical dysplasias</td>
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<td>(FCD) and recent findings to explain pathogenesis of epileptic</td>
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<td>networks, with clinical and neuroimaging correlations.</td>
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<td>- Review the grades of hippocampal sclerosis at the microscopic</td>
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<td>level.</td>
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<td>- Review recent findings of neuronal dispersion and synaptic plexi</td>
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<td>in the U-fibre layer beneath FCD that contribute to epileptic</td>
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<td>networks and distinguish them from heterotopia in deep white matter.</td>
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<td>- Review the two most frequent epileptogenic tumours of cerebral</td>
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<td>cortex.</td>
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<td>- Review neuroimaging correlates of neuropathological lesions.</td>
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<td><strong>Target Audience:</strong></td>
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<td></td>
<td>Neurologists, epileptologists, neurosurgeons, clinical neurophysiologists and neuroradiologists.</td>
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<td><strong>Topics and Speakers:</strong></td>
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<tr>
<td></td>
<td><strong>Neuropathology of Focal Cortical Dysplasias and Related Lesions</strong></td>
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</table>
| Session 4-B | **Parietal Lobe Epilepsy**  
Chair: Dr. Dang Khoa Nguyen, Université de Montréal |

**Learning Objectives:**
- Review the structural and functional connectivity of the parietal lobe.
- Review the semiology of seizures arising from major subdivisions of the parietal lobe.
- Review the value of non-invasive localization techniques in the investigation of parietal lobe epilepsy.
- Review the value of invasive EEG investigation of parietal lobe epilepsy: indications, methods and risks.
- Review the technical considerations, seizure outcomes and risks associated with parietal lobe epilepsy surgery.

**Target Audience:**
Neurophysiologists, neurologists, epileptologists, neurosurgeons, and trainees.

**Topics and Speakers:**

**Structural and Functional Connectivity of the Human Parietal Lobe**  
Jimmy Ghaziri, Université du Québec à Montréal

**Semiology of Parietal Lobe Seizures**  
Dr. Dang K. Nguyen, Université de Montréal

**Non-Invasive and Invasive Investigations of Parietal Lobe Epilepsy**  
Dr. François Dubeau, Montreal Neurological Hospital and Institute

**Parietal Lobe Epilepsy Surgery**  
Dr. Andrew G. Parrent, Western University
## Session 4-C

**Neuropsychiatric Aspects of Epilepsy: Addressing Challenges Across the Lifespan**  
Chair: Dr. Islam Hassan, University of British Columbia

### Learning Objectives:
- Review the challenges presented by neuropsychiatric aspects of epilepsy in pediatric, adult and older adult patients.
- Review recent updates on the diagnosis and management of various neuropsychiatric disorders in patients with epilepsy across the lifespan.
- Review various models of integrating neuropsychiatric care into adult and pediatric epilepsy programs.

### Target Audience:
Neurologists, psychiatrists, psychologists, neuropsychologists, nurses, social workers.

### Topics and Speakers:

**Epidemiology of Neuropsychiatric Aspects of Epilepsy Across the Lifespan**  
Dr. Jose Tellez-Zenteno, University of Saskatchewan

**Psychiatric Diagnosis and Management within a Pediatric Epilepsy Program**  
Dr. Andrea Chapman, University of British Columbia

**Roles of the Neuropsychiatrist within an Adult Epilepsy Program: Clinical Challenges and Models of Care**  
Dr. Islam Hassan, University of British Columbia

**The Impact of Neurocognitive Deficits in Older Adults with Epilepsy**  
Dr. Marilyn Jones-Gotman, McGill University

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<th>Time</th>
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<tr>
<td>12:30 p.m.</td>
<td>Harbourfront Foyer On-The-Go Lunch</td>
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<tr>
<td>12:30 p.m.</td>
<td>Corporate Advisory Lunch (by invitation only)</td>
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</tbody>
</table>
**POSTERS**

Posters will be on display throughout the conference. The poster tour is Saturday October 14, 12:45 p.m. – 1:45 p.m. Authors are required to stand by their poster for a Q&A at this time.

<table>
<thead>
<tr>
<th>Abstract #</th>
<th><strong>NEUROIMAGING</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>5</strong></td>
<td><strong>Multiple Subject Barycentric Discriminant Analysis: A New Metric for Ascertaining Whole Brain Network Atypicality</strong>&lt;br&gt;Lyne J Williams¹, Danny Kim², Kevin P.V. Fitzpatrick² , Bruce H. Bjornson²  &lt;br&gt;&lt;br&gt;¹BC Children’s Hospital MRI Research Facility, BCCH Research Institute Brain Mapping  &lt;br&gt;²Neuroinformatics &amp; Neurotechnology Laboratory, Division of Neurology, Department of Pediatrics, University of British Columbia</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td><strong>Postictal Hypoperfusion measured by MR Arterial Spin Labeling: Localization of the Seizure Onset Zone</strong>&lt;br&gt;Ismael Gaxiola-Valdez, Shaily Singh, Tefani Perera , Sherry Sandy, Emmy Li, Paolo Federico  &lt;br&gt;University of Calgary</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td><strong>Temporal Lobe Epilepsy: Microscopic Hippocampal Anomalies Modulate Whole-Brain Pathoconnectomics</strong>&lt;br&gt;Boris Bernhardt, Min Liu, Seok-Jun Hong , Andrea Bernasconi, Neda Bernasconi  &lt;br&gt;Montreal Neurological Institute</td>
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<tr>
<td><strong>8</strong></td>
<td><strong>Multimodal Neuroimaging Models for Lateralizatio of Temporal Lobe Epilepsy</strong>&lt;br&gt;Mohammad-Reza Nazem-Zadeh¹, Kost Elisevich², Hamid Soltanian-Zadeh¹  &lt;br&gt;&lt;br&gt;¹Henry Ford Health System, Detroit  &lt;br&gt;²Spectrum Health Medical Group, Grand Rapids</td>
</tr>
<tr>
<td><strong>9</strong></td>
<td><strong>The Use of Measurements from the Temporal Lobe Pole to Posteriorly structures of the Temporal Lobe in Surgical Planning for Anterior Neocortical Amygdalohippocampectomy: A Magnetic Resonance Imaging Study</strong>&lt;br&gt;Paulo Henrique Pires de Aguiar¹,²,³, Rogério Aires¹,³,⁴, Iracema Araújo Estevão⁵, Bruno Camporeze⁵, Rene Arikawa⁶, Rui Castello Branco Pinheiro⁶, Fábio Jundy Nakasone⁶, Carlos Tadeu Parisi de Oliveira⁷  &lt;br&gt;&lt;br&gt;¹Department of Neurosurgery, Santa Paula Hospital  &lt;br&gt;²Department of Neurology, Pontifical Catholic University of São Paulo  &lt;br&gt;³ Department of Neurosurgery, Public Servant Hospital of São Paulo  &lt;br&gt;⁴Department of Neurosurgery, Bandeirantes Hospital  &lt;br&gt;⁵ Medical School of São Francisco University, Bragança Paulista  &lt;br&gt;⁶Department of Radiology, Santa Paula Hospital  &lt;br&gt;⁷Department of Neurosurgery, São Francisco University Hospital</td>
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2Departments of Clinical Neurosciences and Community Health Sciences, and O'Brien Institute for Public Health, University of Calgary  
3Department of Clinical Neurosciences, Hotchkiss Brain Institute |
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\(^1\)Faculty of Biomedical Engineering, University of Toronto  
\(^2\)Fundamental Neurobiology, Krembil Research Institute, University Health Network  
\(^3\)Physical Sciences, Sunnybrook Research Institute, Toronto; Department of Medical Biophysics, University of Toronto  
\(^4\)Fundamental Neurobiology, Krembil Research Institute, University Health Network, Toronto, Ontario; Physical Sciences, Sunnybrook Research Institute, Toronto |
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\(^2\)Foothills Medical Centre, University of Calgary |
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<td>&lt;sup&gt;4&lt;/sup&gt; Toronto Western Hospital, University of Toronto, Krembil Research Institute</td>
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