Day 1: Monday, June 16

8:00 AM - 8:15 AM  Welcome  
Rob Brownstone, Dalhousie University

Session 1: Motoneuron and Motor Unit Firing I

8:15 AM - 8:30 AM  Introduction  
CJ Heckman, Northwestern University

8:30 AM - 8:55 AM  Cooperative gating by clustered voltage-gated Cav1.3 channels enhances inward currents in neurons  
Marc Binder, University of Washington School of Medicine

8:55 AM - 9:20 AM  The subprimary range and force generation in the cat.  
Hans Hultborn, University of Copenhagen

9:20 AM - 9:40 AM  The bistable lumbar motoneuron: a four-stroke engine in producing plateau potentials  
Frédéric Brocard, Institut de Neurosciences de la Timone. CNRS - Aix Marseille University

9:40 AM - 9:55 AM  Action potential threshold of motoneurons during fictive scratch and swim  
Aidas Alaburda, Vilnius University

9:55 AM – 10:15 AM  Coffee Break

10:15 AM - 10:30 AM  Memory in spinal motoneurons  
Michael Johnson, Northwestern University Feinberg School of Medicine

10:30 AM - 10:45 AM  Time course of human motoneuron recovery from sustained activity at a constant firing rate
10:45 AM – 11:00 AM  
**Inhibitory Post-synaptic Potentials in Standing**  
Jayne Garland, University of British Columbia

11 AM - 11:20 AM  
**Double discharges and afterhyperpolarization in human motoneurons**  
Maria Piotrkiewicz, Nalecz Inst Biocybern Biomedical Eng Polish Academy of Sciences

11:20 AM - 11:40 AM  
Discussion

11:40 AM – 2:00 PM  
Lunch and Posters

**Session 2: Motoneuron and Motor Unit Plasticity**

2:00 PM - 2:15 PM  
Introduction  
Jorn Hounsgaard, University of Copenhagen

2:15 PM - 2:40 PM  
**Principles governing the subthreshold input-to-output properties of motoneurons - the view from the dendritic tree**  
Ken Rose, Queen's University

2:40 PM – 3:00 PM  
**Homeostatic plasticity in motoneurons from mice with glycine receptor mutations**  
Bob Callister, University of Newcastle

3:00 PM - 3:15 PM  
**The effects of passive cycling following a spinal transection on serotonin receptor mRNA expression in hindlimb flexor and extensor alpha-motoneurons**  
Jeremy Chopek, University of Manitoba
3:15 PM - 3:30 PM  
**How plastic is the motoneurone axon initial segment?**  
Claire Meehan, Copenhagen University

3:30 PM - 3:45 PM  
**Time-related changes of motoneuron properties after chronic compensatory muscle overload**  
Piotr Krutki, University School of Physical Education

3:45 PM – 4:00 PM  
**Coffee Break**

4:00 PM - 4:25 PM  
**Hebbian plasticity in the spinal cord?**  
Andrew Fuglevand, University of Arizona, College of Medicine

4:25 PM - 4:50 PM  
**The recurrent discharge of human motoneurones is reduced by voluntary but not antidromic activation**  
Simon Gandevia, Neuroscience Research Australia

4:50 PM - 5:05 PM  
**Daily use of hand muscles with and without spinal cord injury**  
Christine Thomas, University of Miami

5:05 PM - 5:20 PM  
**Motoneurones keep calm and carry on: Pain during fatigue does not change the excitability of motoneurones of the leg**  
David Kennedy, Neuroscience Research Australia and University of New South Wales

5:20 PM – 5:40 PM  
**Discussion**

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**Day 2: Tuesday, June 17**

8 AM - 8:15 AM  
**Perspective: Opportunities for therapeutic development in ALS**  
Lucie Bruijn, The ALS Association

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**Session 3: Motoneurons and ALS**

8:15 AM - 8:30 AM  
**Introduction**  
John Ravits, UC San Diego
8:30 AM - 8:50 AM  
Hypervigilant regulation as ALS-cause: evidence from ALS patients and transgenic mouse models  
Cassie Mitchell, Georgia Institute of Technology

8:50 AM - 9:10 AM  
Mechanisms of ALS mutant FUS mediated motor neuron degeneration: evidence for a toxic gain of function in a novel mouse model of disease  
Neil Shneider, Columbia University Medical Center

9:10 AM - 9:30 AM  
Mechanical, electrical and molecular properties of mouse motor unit subtypes  
Marin Manuel, CNRS UMR 8119

9:30 AM - 9:55 AM  
Is motoneuron hyperexcitability harmful in ALS?  
Daniel Zytnicki, Paris Descartes University

9:55 AM – 10:15 AM  
Coffee break

10:15 AM - 10:30 AM  
Sex specific contributions to altered motoneuron size in SOD1G93A ALS mouse model  
Katharina Quinlan, Northwestern University Feinberg School of Medicine

10:30 AM - 10:45 AM  
Chemogenetics and high-sensitivity performance test reveal new excitation-dependent and intrinsic vulnerability mechanisms in ALS mouse model  
Francesco Roselli, Friedrich Miescher Institute

10:45 AM – 11:00 AM  
Vibration-induced H-reflex inhibition is suppressed in ALS: A biomarker for upper motor neuron dysfunction?  
Michael Lee, Neuroscience Research Australia

11:00 AM – 11:15 AM  
Sensorimotor impairment in Amyotrophic Lateral Sclerosis (ALS)  
Sina Sangari, UPMC univ Paris 6
11:15 AM - 11:30 AM  
**Human iPSC-derived motoneurons harbouring TDP-43 or C9orf72 ALS mutations are dysfunctional despite maintaining viability**
Anna Claire Devlin, School of Psychology and Neuroscience, University of St Andrews

11:30 AM – 11:50 AM  
**Discussion**

11:50 AM – 2:00 PM  
**Lunch and posters**

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**Session 4: Development and Diversity of Motoneurons**

2:00 PM - 2:15 PM  
**Introduction**
Sam Pfaff, Salk Institute

2:15 PM - 2:35 PM  
**A shared requirement for POU3F1 in distally projecting motor neurons enables innervation of muscles critical to respiration and grasping**
Kevin Kanning, Columbia University

2:35 PM - 2:55 PM  
**Fine tuning the final common path: molecular pathways driving motor neuron functional diversification and plasticity**
Till Marquardt, European Neuroscience Institute

2:55 PM - 3:15 PM  
**Development of electrical and morphological properties of lumbar motoneurons in the mouse**
Jacques Durand, CNRS & AMU UMR7289

3:15 PM - 3:30 PM  
**Functional organization of spinal motor neurons revealed by ensemble imaging**
Timothy Machado, Columbia University

3:30 PM – 3:45 PM  
**Coffee Break**

3:45 PM - 4 PM  
**Number, size and distribution of motoneurons in motor nucleus of male and female rat medial gastrocnemius**
Jan Celichowski, University School of Physical Education in Poznan
4 PM - 4:15 PM  
*Signalling through MuSK and the acetylcholine receptor mediate the retention of neuromuscular connections*  
William Phillips, The University of Sydney

4:15 PM - 4:30 PM  
*Loss of β2-laminin alters calcium sensitivity and voltage gated calcium channel maturation of neurotransmission at the neuromuscular junction*  
Peter Noakes, The University of Queensland

4:30 PM - 4:45 PM  
*Spinal neuron identity and survival in the absence of neurosecretion*  
Chris Law, Institut de recherches cliniques de Montréal

4:45 PM – 5:00 PM  
*Mechanisms of cholinergic synapse formation in mouse spinal cord*  
Kuo-Fen Lee, The Salk Institute

5:00 PM – 5:20 PM  
Discussion

6:30 PM  
Dinner and evening presentation – Pier 21  
*Bus transporstation available from theLord Nelson. Otherwise a 20 minute walk along the seafront promenade*  
Historical Talk by Douglas Stuart, University of Arizona  
*William c. Gibson (1913-2009): a neurologist/psychiatrist of many talents*

Day 3: Wednesday, June 18

**Session 5: Motoneuron and Motor Unit Pathophysiology**

8 AM - 8:15 AM  
Introduction  
Inge Zijdewind, University Medical Center Groningen

8:15 AM - 8:40 AM  
*Non-cell autonomous mechanisms induce dysfunction of motor neurons in a mouse model of Spinal Muscular Atrophy*  
George Mentis, Columbia University
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:40 AM – 9:00 AM</td>
<td>Mutations in glycyl-tRNA synthetase that cause peripheral neuropathy CMT2D create a neomorphic protein that antagonizes VEGF-Nrp1 signaling</td>
<td>Sam Pfaff</td>
<td>Salk Institute</td>
</tr>
<tr>
<td>9:00 AM - 9:15 AM</td>
<td>'Roid 'Rage - The mechanism of neurosteroid-mediated excitation of motor neurons</td>
<td>Mark Bellingham</td>
<td>University of Queensland</td>
</tr>
<tr>
<td>9:15 AM - 9:30 AM</td>
<td>Mechanisms regulating axonal transport and motor neuron degeneration</td>
<td>Yong-Chao Ma</td>
<td>Northwestern University Feinberg School of Medicine</td>
</tr>
<tr>
<td>9:30 AM - 9:45 AM</td>
<td>Motor unit number estimation and functional tasks</td>
<td>Stephane Baudry</td>
<td>Université Libre de Bruxelles</td>
</tr>
<tr>
<td>9:45 AM – 10:05 AM</td>
<td>Coffee break</td>
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<tr>
<td>10:05 AM - 10:20 AM</td>
<td>Spinal plasticity in stroke patients after botulinum neurotoxin A injection in ankle plantarflexors</td>
<td>veronique Marchand-Pauvert</td>
<td>Inserm</td>
</tr>
<tr>
<td>10:20 AM - 10:35 AM</td>
<td>Anomalous EMG-force relations during stretch reflex responses in stroke survivors</td>
<td>Nina Suresh</td>
<td>Rehabilitation Institute of Chicago</td>
</tr>
<tr>
<td>10:35 AM - 10:50 AM</td>
<td>Mechanisms of spasticity in cerebral palsy</td>
<td>Monica Gorassini</td>
<td>University of Alberta</td>
</tr>
<tr>
<td>10:50 AM - 11:05 AM</td>
<td>Evidence of systemic depolarization &amp; prolonged Ia EPSP in α motoneurons of hemispheric stroke survivors</td>
<td>Matthieu Chardon</td>
<td>Northwestern University</td>
</tr>
</tbody>
</table>
11:05 AM - 11:15 AM  
*Contradictions in motoneurone discharge behaviour after stroke: comparing activity from the more-affected side, less-affected side and healthy subjects*  
Penelope McNulty, Neuroscience Research Australia

11:15 AM - 11:30 AM  
*Optogenetic control of muscle contraction attenuates denervation atrophy: who needs motor neurons?*  
Victor Rafuse, Dalhousie University

11:30 AM – 11:50 AM  Discussion

11:50 AM – 12:00 PM  Business Meeting

12:00 PM – 12:10 PM  Group Photo

1:00 PM – 16:30 PM  Peggy’s Cove tour (optional, pre-registration required)  
Please see the Social Events and Excursions webpage for further details

**Day 4: Thursday, June 19**

**Session 6: Motoneurons and Motor Units in Circuits**

8:00 AM - 8:15 AM  
**Introduction**  
Martyn Goulding, The Salk Institute

8:15 AM - 8:40 AM  
*Sensorimotor control circuits in dragonfly prey capture*  
Anthony Leonardo, HHMI

8:40 AM - 9:05 AM  
*Inhibition, burstlets and percolation: role in generating respiratory drive to motoneurons*  
Jack Feldman, UCLA

9:05 AM - 9:25 AM  
*Motoneurons, orchestrated by modular clocks or global networks?*  
Jorn Hounsgaard, University of Copenhagen
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
</table>
| 9:25 AM - 9:40 AM | *En passant axonal inhibition far from the presynaptic terminal, produced by 5-HT1D receptors on sensory afferents.*  
                  | David Bennett, University of Alberta                                    |
| 9:40 AM - 9:55 AM | *Group Ia reciprocal excitation between ankle antagonists in a plantigrade animal*  
                  | Adam Deardorff, Wright State University                                  |
| 9:55 AM – 10:15 AM | Coffee break                                                           |
| 10:15 AM - 10:40 AM | *Modulation of Motoneuron firing by recurrent inhibition in adult rat in vivo*  
                  | Timothy Cope, Wright State University                                    |
| 10:40 AM - 11:05 AM | *A new method to determine reflex latency induced by high rate stimulation of the nervous system*  
                  | Kemal Turker, Koc University                                              |
| 11:05 AM - 11:20 AM | *Effects induced by motor cortex anodal transcranial direct current stimulation on wrist muscles in stroke patients*  
                  | Alexandra Lackmy-Vallee, INSERM, CNRS, UPMC                             |
| 11:20 AM - 11:35 AM | *Motor unit firing patterns during abnormal multi-joint coupling in chronic hemiparetic stroke*  
                  | Laura Miller, Northwestern University                                     |
| 11:35 AM – 11:55 PM | Discussion                                                             |
| 11:55 AM – 2:00 PM | Lunch and posters                                                      |

**Session 7: Motoneuron and Motor Unit Firing II**
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 PM</td>
<td>Introduction</td>
<td>Larry Jordan, University of Manitoba</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>Beyond the size principle – Motoneuron pool organization and recruitment during locomotion</td>
<td>Abdel ElManira, Karolinska Institutet</td>
</tr>
<tr>
<td>2:40 PM</td>
<td>Application of concurrent motor unit recordings in the unparalyzed, unanesthetized, decerebrate cat</td>
<td>Christopher Thompson, Northwestern University</td>
</tr>
<tr>
<td>2:55 PM</td>
<td>Microstimulation of single human motor axons: A comparison of the contractile responses to irregular and regular trains of stimuli</td>
<td>Michael Leitch, University of Western Sydney</td>
</tr>
<tr>
<td>3:10 PM</td>
<td>Excitotoxic vulnerability of motoneurons and AHP regulation</td>
<td>Robert Lee, Emory University/Georgia Tech</td>
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<tr>
<td>3:30 PM</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>3:45 PM</td>
<td>Reverse engineering motor unit discharge patterns to estimate the structure of motor commands</td>
<td>Randy Powers, University of Washington</td>
</tr>
<tr>
<td>4:05 PM</td>
<td>Motoneurons: choosing the right computer model</td>
<td>Sherif Elbasiouny, Wright State University</td>
</tr>
<tr>
<td>4:20 PM</td>
<td>Comparison of the firing patterns of human postganglionic sympathetic neurones and a motoneurones</td>
<td>Vaughan Macefield, University of Western Sydney</td>
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<tr>
<td>4:35 PM</td>
<td>Discussion and closing remarks</td>
<td></td>
</tr>
</tbody>
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