AMERICAN SOCIETY OF **NEUROREHABILITATION**

*and Translational and Computational Motor Control (TCMC)*

# ANNUAL MEETING

## OCTOBER 15-16, 2015

InterContinental Chicago - Magnificent Mile | Chicago , IL

# ONSITE PROGRAM


ASNR

AMERICAN SOCIETY OF **NEUROREHABILITATION**

RE - GENERATE - CONNECT - EDUCATE

# Welcome to the 2015 ASNR Annual Meeting

On behalf of the American Society of Neurorehabilitation (ASNR), we are excited you are joining us for the 2015 Annual Meeting. Our meeting provides interactions among neurorehabilitation clinicians, basic scientists, industry representatives, foundations and funders in a dynamic environment of presentations and discussion. This year symposia topics include the biology of brain recovery networks, the clinical and neural effects of exercise, the mechanisms in forming new nervous system connections during recovery and the process of identifying novel applications of approved drugs for functional recovery. We inaugurate a new Controversies in Neurorehabilitation panel in which experts and audience members will take on a timely and uncertain clinical concept--in this meeting the issue of dose and timing in neurorehabilitation as guided by very recent large scale clinical trials. This meeting also joins with the Translational and Computational Motor Control meeting in joint session with seasoned experts and trainees discussing clinically relevant concepts in motor control and later in parallel sessions with the ASNR.

With poster presentations, oral abstracts and presidential and award talks the meeting will integrate disciplines, people and concepts from different diseases, basic and clinical interests and multiple professional levels into a lively and diverse two days of interaction.

Sincerely,

S. Thomas Carmichael **(Program Chair)**

**On Behalf of the Program Committee:**
Scott Frey, PhD
John Krakauer, MD
Catherine Lang, PT, PhD
Albert Lo, MD, PhD
Jim Lynskey, PhD, PT
W. Zev Rymer, PhD, MD
Michael Selzer, MD, PhD
Keith Tansey, MD, PhD
Michael Weinrich, MD
George Wittenberg, MD, PhD
Steve Wolf, PhD, PT

S. Thomas Carmichael, MD, PhD
2015 ASNR Program
Committee Chair (2015-2016)
David Geffen School of Medicine at UCLA Neurology

**ASNR Mission Statement**
The mission of the ASNR is to promote the medical and social wellbeing of persons with disabling neurological disorders, to advance training and research in the basic and clinical sciences that can lead to functional recovery of neurologically impaired persons, and to disseminate the knowledge of this research among professionals and the general public.

The ASNR promotes:

- Specialty training and identification of those with expertise in neurorehabilitation
- Professional and public education
- Basic science and clinical research in neurorehabilitation
- Communication and collaboration with people with neurological disorders and related organizations
- Mission of Neurorehabilitation Research

# General Information



## Table of Contents



### Handouts

All attendees will receive a link to all available meeting handouts. The link will be sent from info@asnr.com. There will not be any hard copies of handouts made available unless provided by the speaker.

### Registration Hours

Thursday, October 15 (ASNR Meeting): 7:00 am – 5:30 pm
Friday, October 16 (ASNR/TCMC Meeting): 7:00 am – 5:30 pm

### Abstracts

Abstract titles and presenters can be found on pages 24-39. Full text abstracts can be found online at www.asnr.com.

### ASNR Annual Meeting Survey

Please complete the Annual Meeting Survey you received in your email from info@asnr.com. Your responses will prove crucial to the future success of ASNR. Thank you!

## ASNR TRAVEL FELLOWSHIPS FOR DIVERSITY

ASNR is pleased to announce a new travel award, the ASNR Travel Fellowships for Diversity to help offset travel expenses for under-represented individuals interested in the field of neurorehabilitation. ASNR was able to award three fellowships in the amount of $500.

Undergraduate and graduate students are eligible for the fellowship. Awardees are selected according to their academic background, experience, and research interests.

# Program at a Glance - Thursday

**Thursday, October 15**

| TIME | TOPIC | LOCATION |
|---|---|---|
| **7:00 am – 8:00 am** | **EXHIBITS & REGISTRATION** | Toledo Ballroom & Upper 5th |
| **8:00 am – 8:30 am** | **Introduction and Presidential Oration**<br>**Explaining Neurorehabilitation:**<br>**What do we tell ourselves and our patients?**<br>George Wittenberg, MD, PhD, FASNR | Renaissance |
| **8:30 am – 10:00 am** | **Symposium #1:**<br>**The Uninjured Hemisphere in Hemiplegia: Friend or Foe?**<br>Organized by Jason Carmel, MD, PhD<br>*This symposium will be structured in a debate format.*<br><br>Foes' Perspective:<br>**The Uninjured Hemisphere in Hemiplegia: Friend for some and Foe for others**<br>Lara Boyd, PT, PhD<br><br>**Contributions of the healthy and lesioned hemisphere to recovery of motor function**<br>Leonardo Cohen, MD<br><br>Friends' Perspective:<br>**Is the contralesional hemisphere a suitable target for noninvasive brain stimulation after stroke?**<br>Winston Byblow, PhD<br><br>**The Uninjured Hemisphere in Hemiplegia: Friend or Foe?**<br>Jason Carmel, MD, PhD | Renaissance |
| 8:30 am – 8:35 am | Intro of speakers and format<br>*Previous coin toss determines order of presentation* | |
| 8:35 am – 9:00 am | Perspective One presents argument | |
| 9:00 am – 9:25 am | Perspective Two presents argument | |
| 9:25 am – 9:35 am | Rebuttal from Perspective One | |
| 9:35 am – 9:45 am | Rebuttal from Perspective Two | |
| 9:45 am – 10:00 am | Discussion and conclusion | |
| **10:00 am – 12:00 pm** | **Poster Session I & Exhibits** | Toledo Ballroom & Upper 5th |

# Program at a Glance - Thursday

**Thursday, October 15**

| TIME | TOPIC | LOCATION |
|---|---|---|
| **12:00 pm – 12:30 pm** | **Outstanding Neurorehabilitation Clinician-Scientist Award Presentation and Lecture**<br>A common physiological phenotype of abnormal network connectivity predicts multiple behavioral impairments in stroke<br>*Presented by the 2015 Award Recipient: Maurizio Corbetta, MD* | Renaissance |
| **12:30 pm – 1:30 pm** | **LUNCH** (on your own) | |
| **1:30 pm – 3:00 pm** | **Symposium #2:**<br>**Aerobic Exercise Effects on Neuroplasticity: From Neurobiology to Behavior**<br>Organized by Cameron S. Mang, MSc | Renaissance |
| 1:30 pm – 2:00 pm | **Effects of exercise on human cognitive functions, motor learning and memory**<br>Jesper Lundbye-Jensen, MSc, PhD | |
| 2:00 pm – 2:30 pm | **Acute effects of high-intensity aerobic exercise on neuroplasticity and motor learning**<br>Cameron Mang, MSc | |
| 2:30 pm – 3:00 pm | **Aerobic exercise effects on neuroplasticity - from animal models to clinical trials**<br>Michelle Ploughman, PT, PhD | |
| **3:00 pm – 3:30 pm** | **Viste Award Presentation and Lecture:**<br>Neurological Rehabilitation in the late 20th and early 21st Centuries:<br>Where we are, where we have been, and where we are going<br>*Presented by the 2015 Award Recipient: Mindy Aisen, MD* | Renaissance |
| **3:30 pm – 3:45 pm** | **EXHIBITS & BREAK** | Toledo Ballroom & Upper 5th |

# Program at a Glance - Thursday

**Thursday, October 15**

| TIME | TOPIC | LOCATION |
|---|---|---|
| **3:45 pm – 5:15 pm** | **Symposium #3:**<br>**Axonal Sprouting and Growth after Neural Injury**<br>*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this symposium*<br>Organized by S. Thomas Carmichael, MD, PhD | Renaissance |
| 3:45 pm – 3:50 pm | **Introduction**<br>S. Thomas Carmichael, MD, PhD | |
| 3:50 pm – 4:10 pm | **Rewiring injured neural pathways**<br>Larry Benowitz, PhD | |
| 4:10 pm – 4:30 pm | **Nociceptive Afferent Sprouting, Hypereflexia and Dysautonomia in Spinal Cord Injury**<br>Keith Tansey, MD, PhD | |
| 4:30 pm – 4:50 pm | **Molecules that Enhance Axonal Sprouting and Recovery after Stroke**<br>S. Thomas Carmichael, MD, PhD | |
| 4:50 pm – 5:10 pm | **Temporally Regulated GDNF Delivery Prevent Axon Trapping in Long Peripheral Nerve Injuries**<br>Shelly Sakiyama-Elbert, PhD | |
| 5:10 pm – 5:15 pm | **Closing Discussion** | |
| **5:15 pm – 7:00 pm** | **BREAK & EXHIBITS** | Toledo Ballroom & Upper 5th |
| **7:00 pm – 9:00 pm** | **ASNR Education Foundation Dinner & Kessler Foundation Award Lecture:**<br>How to create an ecosystem of innovation and a culture of servant leadership to bridge the gap between innovation and access, and improve patient care<br>*Presented by 2015 Kessler Award Recipient: Ross Mason, MBA* | King Arthur's Court |

## New this year for ASNR Members:

**ASNR Mentoring Breakfast** (pre-registration was required for this event)
This program has been created to further meet the ASNR's mission and promote membership, education, communication, and support research and practice in neurorehabilitation. Made possible by the Craig H. Neilsen Foundation.

Thank you to the ASNR volunteer mentors:

Diane Adamo, OTR, MS, PhD
Jason Carmel, MD, PhD
Tom Carmichael, MD, PhD
Leonardo Cohen, MD
Bruce Dobkin, MD
Gail Eskes, PhD
Scott Frey, PhD
David Good, MD
Catherine Lang, PT, PhD
Mindy Levin, PT, PhD
W. Zev Rymer, MD, PhD
Keith Tansey, MD, PhD
Krish Sathian, MD, FAAN
Steve Wolf, PhD, PT

# Program at a Glance - Friday

**Friday, October 16**

| TIME | TOPIC | LOCATION |
|---|---|---|
| **7:00 am – 8:00 am** | **EXHIBITS & REGISTRATION** | Toledo Ballroom & Upper 5th |
| **7:00 am – 8:00 am** | **ASNR Mentoring Breakfast**<br>This is a ticketed event that required pre-registration<br>*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this Breakfast* | Michigan Room |
| **8:00 am – 10:00 am** | **Symposium #4:**<br>**ASNR/TCMC Joint Session:**<br>**Applied patient-based motor symposium**<br>Featured Speakers and Trainee Presentations<br>Organized by John Krakauer, MD & Maurice Smith, MD, PhD<br><br>**Featured Speakers:**<br>**What parietal apraxia reveals about the brain's two action systems**<br>Laurel Buxbaum, PsyD<br><br>**Motor cortex as a 'tutor' for the striatum during motor skill learning**<br>Bence Ölveczky, PhD | Renaissance |
| **10:00 am – 12:00 pm** | **Poster Session II & Exhibits** | Toledo Ballroom & Upper 5th |
| **11:00 am – 12:00 pm** | **TCMC REGISTRATION** | Elevator Lobby |
| **12:00 pm – 7:00 pm** | **TCMC Session**<br>Featured Speakers and Trainee Presentations<br>Organized by John Krakauer, MD & Maurice Smith, MD, PhD<br><br>**Featured Speakers:**<br>**Large-Scale Neural Circuit Dynamics During Neuroprosthetic Skill Learning**<br>Jose Carmena, PhD<br><br>**The cortical hierarchy of motor representations: Decoding the building blocks of motor skill**<br>Jörn Diedrichsen, PhD | Renaissance |
| **12:00 pm – 1:30 pm** | **LUNCH** (on your own) | |

# Program at a Glance - Friday

**Friday, October 16**

| TIME | TOPIC | LOCATION |
|---|---|---|
| **1:30 pm – 2:30 pm** | **ASNR Oral Abstracts**<br>Introduction by S. Thomas Carmichael, MD, PhD | Toledo Ballroom |
| 1:30 pm – 1:42 pm | **Assessing Cognitive Function Following Medial Prefrontal Stroke in the Rat**<br>Jessica Livingston-Thomas, PhD | |
| 1:42 pm – 1:54 pm | **Improving Walking with an Implanted Pulse Generator for Hip, Knee and Ankle Control After Stroke: A Case Report**<br>Nathaniel Makowski, PhD | |
| 1:54 pm – 2:06 pm | **Changes in Synaptic Function and Excitability in Single Neurons Following Transcranial Magnetic Stimulation**<br>N A Matheson, BSc, PgDipSci | |
| 2:06 pm – 2:18 pm | **Enhancing Cortical Representational Plasticity with Non-Invasive Direct Current Stimulation to Accelerate Upper Limb Recovery in Quadriplegia**<br>Kelsey Potter-Baker, PhD | |
| 2:18 pm – 2:30 pm | **Detection and Predictive Value of Fractional Anisotropy Abnormalities in the Acute Stroke Patients**<br>Gottfried Schlaug, PhD | |
| **2:30 pm – 4:00 pm** | **Symposium #5:**<br>**Novel Applications of FDA Approved Drugs in Neurologic Rehabilitation**<br>*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this symposium*<br>Organized by William Zev Rymer, MD, PhD & Rajiv Ratan, MD, PhD | Toledo Ballroom |
| 2:30 pm – 2:45 pm | **Introduction** | |
| 2:45 pm – 3:05 pm | **Repurposing Drugs to Repair the Brain**<br>Rajiv Ratan, MD, PhD | |
| 3:05 pm – 3:15 pm | **Clinically approved daidzein enhances cholesterol homeostasis via ApoE to promote stroke recovery in mice**<br>Sunghee Cho, PhD | |
| 3:15 pm – 3:25 pm | **Drugs for Motor Rehabilitation – a fine balancing act**<br>Monica Gorassini, PhD | |
| 3:25 pm – 3:35 pm | **Combined pharmacological and physical interventions following neurological injury**<br>T. George Hornby, PhD, PT | |
| 3:35 pm – 3:45 pm | **Inflammatory suppression augments intermittent hypoxia-induced plasticity in individuals with spinal cord injury**<br>Milap Sandhu, PT, PhD | |
| 3:45 pm – 4:00 pm | **Discussion and wrap-up** | |

# Program at a Glance - Friday

**Friday, October 16**

| TIME | TOPIC | LOCATION |
|---|---|---|
| 4:00 pm – 4:30 pm | **BREAK** | Toledo Foyer |
| 4:30 pm – 5:45 pm | **Controversies in Neurorehabilitation**<br>*Presented by Carolee Winstein, PhD, PT, FAPTA*<br>*Moderated by Catherine Lang, PT, PhD*<br><br>**Panel:**<br>Dave Brown, MD<br>Steve Cramer, MD<br>T. George Hornby, PT, PhD<br>Albert Lo, MD, PhD | Toledo Ballroom |
| **5:45 pm – 6:15 pm** | **ASNR Business Meeting** | Toledo Ballroom |

# Meeting Program

**Thursday, October 15 8:00 am – 8:30 am**
**Renaissance**

**Introduction and Presidential Oration**
*Explaining Neurorehabilitation:*
*What do we tell ourselves and our patients?*
George Wittenberg, MD, PhD, FASNR

George Wittenberg, MD, PhD, FASNR
*University of Maryland*

**Explaining Neurorehabilitation:**
**What do we tell ourselves and our patients?**

There are many ways to look at scientific explanations, but the most standard approach is to define the natural laws that apply and use them in combination to known conditions to explain the result. Explanation in neuroscience is problematic because of probabilistic laws and lack of knowledge of the state of the nervous system. But we can start to explain recovery in terms of changes in connectivity in known parts of the brain, using maps as a helpful visual aid. When it comes to explaining function and recovery to our patients, we often fall short of useful or satisfying explanations, but a little enlightenment goes a long way. Besides producing positive clinical trial results, our role in explaining the mechanisms of disability and recovery is one of the most important for the future of our field.

**Thursday, October 15**
**Renaissance**

**8:30 am – 10:00 am**

Symposium #1:
**The Uninjured Hemisphere in Hemiplegia: Friend or Foe?**
*Organized by Jason Carmel, MD, PhD*
This symposium will be structured in a debate format.

**Foes' Perceptive:**

Lara Boyd, PT, PhD
*University of British Columbia*

### The Uninjured Hemisphere in Hemiplegia: Friend for some and Foe for others

In this talk Dr. Boyd will discuss recent data from her work illustrating the role of the contralesional hemisphere in motor learning and recovery after stroke. She will provide evidence to support the idea that for some individuals with stroke the contralesional hemisphere interferes with motor learning and recovery while in others it appears to aid motor function. Data illustrating showing which individuals fall into each of these categories will be presented.

Learning Objectives:

1. To describe the interhemispheric relationships that likely influence motor function normally and after stroke
2. To provide evidence showing different patterns of interhemispheric interactions after stroke
3. To illustrate how different patterns of interhemispheric interactions after stroke impact motor function and recovery

### Contributions of the healthy and lesioned hemisphere to recovery of motor function

Previous work demonstrated that depending on the circumstances, the healthy and lesioned hemisphere may contribute to recovery of motor function after chronic stroke. The magnitude of the adaptive/maladaptive role of each hemisphere depends on a variety of factors, one of which appears to be the degree of motor impairment. The presentation will discuss this evidence and the implications for the choice of rehabilitative interventions for motor function after chronic stroke.

Leonardo Cohen, MD
*National Institute of Neurological Disease and Stroke*

**Thursday, October 15** **8:30 am – 10:00 am**
**Renaissance**

Symposium #1:
**The Uninjured Hemisphere in Hemiplegia: Friend or Foe?**
*Organized by Jason Carmel, MD, PhD*
This symposium will be structured in a debate format.

**Friends' Perceptive:**

Winston Byblow, PhD
*University of Auckland*

### Is the contralesional hemisphere a suitable target for noninvasive brain stimulation after stroke?

Stroke is the leading cause of adult disability and there are no treatments that can repair neural damage that results from stroke. Functional recovery for many patients is modest and therefore adjuvants to traditional therapies are urgently required. This talk will revisit the use of non-invasive brain stimulation (NIBS) as a potential adjuvant for stroke rehabilitation, which is well documented in clinical neurophysiological research, but not routinely used in clinical practice. One tenet is that functional restoration may be enhanced using techniques that increase excitability in the hemisphere in which the lesion has occurred, through LTP-like mechanisms, and this has led to some promising outcomes. Perhaps more contentious is the idea that the non-stroke (contralesional) hemisphere is also a target for NIBS that aim to suppress neuronal excitability. This idea is fostered by a model of interhemispheric competition that espouses an elevation in neural excitability within the contralesional hemisphere. The majority of neurophysiological studies investigating interhemispheric imbalance have been conducted with patients at the chronic stage after stroke, with only a few exceptions. The heightened contralesional excitability may reflect neurophysiological processes that exacerbate functional deficits through interhemispheric competition (via transcallosal inhibition). However, at the chronic stage these changes might also reflect a pattern of use (i.e., learned non-use of the weak or paretic side) and activity-dependent plastic reorganisation in the non-stroke hemisphere. From recent studies of motor neurophysiology, I will describe how the contralesional hemisphere may be a viable target for excitability suppression at the chronic stage, but that this is not 'one-size-fits-all'. Finally, I will present neurophysiological and clinical data from a large sample of patients spanning the initial days, weeks and months at the sub-acute stage after stroke. These data indicate interhemispheric imbalance is driven primarily, if not exclusively through diminished excitability in the lesioned hemisphere.

### The Uninjured Hemisphere in Hemiplegia: Friend or Foe?

The most common cause of paralysis is injury to one cerebral hemisphere, leading to hemiparesis of the opposite half of the body. The pattern of paralysis is largely attributable to injury of the corticospinal tract, a crossed connection that is the principal pathway for voluntary movement in people. To restore motor control to the impaired half of the body, the primary strategy has been to restore motor control from the injured hemisphere. One reason that the injured hemisphere is limited in its ability to regain motor control is that it receives inhibitory signals from the uninjured hemisphere. These inhibitory connections, which are transmitted via the corpus callosum, allow independence of movement of the two sides of the body in health. After injury, however these circuits can be deranged, causing the uninjured hemisphere to "bully" the injured hemisphere with excessive transcallosal inhibition. To reduce this bullying, many groups have sought to reduce activity of the uninjured hemisphere. An alternative approach is to drive control of both halves of the body from the uninjured hemisphere. This pattern of innervation can allow substantial hand function of the more affected hand, although it may come at a loss of independence of the two hands. Which hemisphere to support is a major question for systems neuroscience and especially for investigators who use focal therapy for brain repair.

Jason Carmel, MD, PhD
*Weill Medical College of Cornell University*

**Thursday, October 15**
**Renaissance**

**12:00 pm – 12:30 pm**

**ONCS Award Presentation and Lecture**
*Presented by the 2015 Award Recipient: Maurizio Corbetta, MD*

Maurizio Corbetta, MD
*Washington University in Saint Louis*

### A common physiological phenotype of abnormal network connectivity predicts multiple behavioral impairments in stroke

Deficits following stroke are classically attributed to focal damage, but recent evidence suggests a key role of distributed brain network disruption. I will discuss the results of a new study in which we measured resting functional connectivity (FC), lesion topography MRI, and behavior in multiple domains (attention, memory, language, motor, visual) in a large cohort of stroke patients at 2 weeks, and used machine-learning to predict neurological impairment in individual subjects. We identified a general behaviorally relevant pattern of physiological network dysfunction consisting of a loss of inter-hemispheric coherence and an increase of intra-hemispheric coherence. Coherence of regions with a high participation coefficient (hubs) predicted deficits across behavioral domains while network-specific patterns of coherence predicted deficits in specific behavioral domains. However, attention and memory were better predicted by FC whereas visual and motor impairments were better predicted by lesion topography. These results link key organizational features of brain networks to brain-behavior relationships in stroke.

**Thursday, October 15**
**Renaissance**

**1:30 pm – 3:00 pm**

Symposium #2:
**Aerobic Exercise Effects on Neuroplasticity: From Neurobiology to Behavior**
*Organized by Cameron Mang, MSc*

Jesper Lundbye-Jensen, MSc, PhD
*University of Copenhagen*

### Effects of exercise on human cognitive functions, motor learning and memory

The positive effects which cardiovascular exercise may have on several aspects of cognitive functioning are well established. During the recent years, there has been an increasing focus on neuroplasticity and on the processes underlying memory formation and learning, and several studies documented positive interactions between exercise, memory and learning. The mechanisms underlying the effects of exercise on human memory and learning, however, remain controversial. Recent studies have attempted to identify potential modulators or biomarkers that could contribute to the divergent effects of exercise on both declarative and nondeclarative memory as seen in motor learning. There has also been an emerging interest in understanding how specific parameters of exercise, such as intensity, might influence the effects on memory. One important but commonly neglected parameter that is essential for memory formation processes is the timing of exercise. We present data supporting the hypothesis that the effects of cardiovascular exercise on memory are not only intensity but also time-dependent. The results encompass studies focusing primarily on the effects of acute exercise on mechanisms involved in motor memory but results from longitudinal studies also include effects of exercise on cognitive functions and academic performance. We argue that strategically scheduled exercise performed in close proximity to learning sessions may promote the effects of exercise on learning and memory in part through an effect on consolidation.

**Thursday, October 15** **1:30 pm – 3:00 pm**
**Renaissance**

Symposium #2:
**Aerobic Exercise Effects on Neuroplasticity: From Neurobiology to Behavior**
*Organized by Cameron Mang, MSc*

Cameron Mang, MSc
*University of Alberta*

### Acute effects of high-intensity aerobic exercise on neuroplasticity and motor learning

There is a growing body of evidence demonstrating the benefits of aerobic exercise on cognition, with some of the largest effects demonstrated specifically in memory processes. Interestingly, recent work has suggested that the acute effects of a single bout of aerobic exercise on memory are more robust than, and distinct from, chronic effects of longer-term aerobic exercise training. The majority of studies investigating acute aerobic exercise effects on memory have employed verbal/vocabulary learning and image recall tests with a focus on declarative learning and memory. Less is known about the potential effects of a single bout of aerobic exercise on motor learning, yet such effects could have important implications for neurorehabilitation strategies for people with movement impairments. In this presentation, we will discuss evidence for the positive impact of high-intensity aerobic exercise on implicit sequence-specific motor learning, and the underlying neurophysiology as evaluated with transcranial magnetic stimulation techniques in human participants. Further, we will consider individual characteristics of participants that may impact behavioural and neurophysiological response to aerobic exercise.

### Aerobic exercise effects on neuroplasticity – from animal models to clinical trials

Aerobic exercise impacts markers of neuroplasticity in animal models of stroke and multiple sclerosis. Dr. Ploughman will discuss how information gleaned from preclinical research, such as optimal training parameters, timing of intervention and sensitivity of behavioral outcomes, helps to inform translational research.

Michelle Ploughman, PT, PhD
*Memorial University of Newfoundland*

**Thursday, October 15** **3:00 pm – 3:30 pm** **Viste Award Presentation and Lecture**
**Renaissance**
*Presented by the 2015 Award: Recipient Mindy Aisen, MD*

Mindy Aisen, MD
*Rancho Los Amigos National Rehabilitation Center*

### Neurological Rehabilitation in the late 20th and early 21st Centuries: Where we are, where we have been, and where we are going

Historical review of rehabilitation approaches; the transformative impact of neuroscientists entering the debate and the clinical arena; the role of technology in fostering intensive/task specific/engaging practice for genuine recovery; new frontiers (including neuro-modulation, dynamic brain imaging, e-health); and the new role for neuro-rehabilitation under the Affordable Care Act.

**Thursday, October 15**
**Renaissance**

**3:45 pm – 5:15 pm**

Symposium #3:
**Axonal Sprouting and Growth after Neural Injury**
*Organized by S. Thomas Carmichael, MD, PhD*

*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this Symposium*

Larry Benowitz, PhD
*Harvard University*

### Inosine enhances the rewiring of injured CNS pathways

The inability of neurons to regenerate axons after CNS injury, combined with the weak capacity of uninjured neurons to form compensatory connections, severely limits recovery after stroke, spinal cord injury, or other types of CNS damage. Inosine is a metabolite of adenosine that crosses the cell membrane of neurons and activates Mst3b, a component of the cell-signaling pathway that controls axon outgrowth. Following a unilateral stroke in the rat motor cortex, inosine enhances the ability of motor neurons in the undamaged hemisphere to extend axon collaterals across the spinal cord midline into areas that have lost their normal innervation and improves skilled use of the impaired forelimb. This effect is further enhanced by combining inosine with environmental enrichment or with an agent that counteracts myelin-associated growth inhibitors. In a spinal cord injury (SCI) model, inosine increases the sprouting of serotonergic axons that regulate intrinsic spinal cord activity, along with the ability of damaged corticospinal axons to extend collateral branches rostral to the injury site. These collateral branches can form synaptic connections with interneurons that, in the case of incomplete SCI, retain projections from rostral to distal segments of the spinal cord. The formation of these "detour circuits" helps restore volitional control to the hindlimbs. In the optic nerve, Mst3b is activated by the myeloid cell-derived growth factor oncomodulin (Ocm), and combining Ocm with a cAMP analog and pten gene deletion enables retinal ganglion cells to regenerate injured axons from the eye to the brain. Thus, inosine and certain growth factors activate Mst3b and can help improve recovery after stroke, spinal cord injury, and optic nerve damage.
*Support: NINDS, NEI, Dept. of Defense, Dr. Miriam and Sheldon Adelson Medical Research Foundation.*

### Nociceptive Afferent Sprouting, Hypereflexia and Dysautonomia in Spinal Cord Injury

Anatomical and physiological plasticity following neural injury is usually considered necessary for recovery of lost functions such as movement. The same plasticity, however, may also underlie the emergence of so-called "positive phenomena" such as spasticity, neuropathic pain, and autonomic dysfunction. In this presentation, we will discuss the plasticity of nociceptive cutaneous afferents in the spinal cord and relate those to changes in a nociceptive reflex and in autonomic function following spinal cord injury. We will demonstrate afferent sprouting in both expected and unexpected sites and relate that to nociceptive hypereflexia. We will also demonstrate the relationships between pain afferent subtypes and distinct cardiovascular functions, namely blood pressure and heart rate, both before and after spinal cord injury. Finally, we will demonstrate the treatment effects of a two week course of several pain medications on the development of dysautonomia following spinal cord injury.

Keith Tansey, MD, PhD
*Emory University*

**Thursday, October 15** **3:45 pm – 5:15 pm**
**Renaissance**

Symposium #3:
**Axonal Sprouting and Growth after Neural Injury**
*Organized by S. Thomas Carmichael, MD, PhD*

*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this Symposium*

S. Thomas Carmichael, MD, PhD
*David Geffen School of Medicine at UCLA Neurology*

## Molecules that Enhance Axonal Sprouting and Recovery after Stroke

Stroke causes death, destruction and functional impairment. Stroke also induces a limited amount of repair and recovery. Understanding the normal mechanisms of tissue repair after stroke may allow development of novel therapies to promote more complete recovery in this diseases. Of the mechanisms of tissue repair in stroke, the formation of new connections (axonal sprouting) in brain adjacent to the stroke site occurs in rodents, primates and (with a strong correlative marker) in humans. In pre-clinical models of stroke, axonal sprouting in peri-infarct brain is causally related to recovery of motor function. We have identified several molecules that promote axonal sprouting and recovery. These molecules fall into several categories of brain repair. One category consists of molecules that are induced by stroke and control changes in gene expression that induce a growth program in neurons, such as the molecule ATRX. A second category includes molecules that are induced by stroke and normally block axonal sprouting. These "growth inhibitors" can themselves be blocked to produce an increase new connections and enhanced recovery. These include Ephrin-A5 and the Nogo receptor 1. A third class of molecules is emerging from our most recent studies and includes the actual triggers for axonal sprouting and recovery—the molecules induced by stroke that turn on this overall growth program. The major molecule in this class is GDF10, a TGFb family member. This molecule is induced by stroke in adjacent brain tissue, promotes the formation of new connections and is responsible for a large degree of normal neurological recovery in pre-clinical stroke models. Overall, these molecular systems provide insights into normal stroke recovery and possible candidates for stroke neural repair.

*Support: NINDS, Richard Merkin Foundation for Neural Repair at UCLA, Dr. Miriam and Sheldon Adelson Medical Research Foundation.*

## Temporally Regulated GDNF Delivery Prevent Axon Trapping in Long Peripheral Nerve Injuries

Shelly Sakiyama-Elbert, PhD
*Washington University in Saint Louis*

The use of growth factors, such as glial cell line-derived neurotrophic factor (GDNF), for the treatment of peripheral nerve injury has been useful in promoting axon survival and regeneration. Unfortunately, finding a method that delivers the appropriate spatial and temporal release profile to promote functional recovery has proven difficult. Some release methods result in burst release profiles too short to remain effective over the regeneration period, however prolonged exposure to GDNF can result in axonal entrapment at the site of release. Thus, GDNF was delivered in both a spatially and temporally-controlled manner using a two-phase system comprised of an affinity-based release system and conditional lentiviral GDNF over-expression from SCs. Briefly, SCs were transduced with a tetracycline-inducible (Tet-On) GDNF over-expressing lentivirus prior to transplantation. Three-centimeter acellular nerve allografts (ANAs) were modified by injection of a GDNF-releasing fibrin scaffold under the epineurium, and then used to bridge a 3 cm sciatic nerve defect. To encourage growth past the ANA, GDNF-SCs were transplanted into the distal nerve and doxycycline was administered for varying time periods to determine the optimal duration of GDNF expression in the distal nerve. Live imaging and histomorphometric analysis determined that 6 weeks of doxycycline treatment resulted in enhanced regeneration compared to shorter or longer delivery periods. This enhanced regeneration resulted in increased gastrocnemius and tibialis anterior muscle mass for animals receiving doxycycline for 6 weeks. The results of this study demonstrate that strategies providing spatial and temporal control of delivery can improve axonal regeneration and functional muscle reinnervation.

# ASNR Education Foundation Dinner - Thursday

**Thursday, October 15** **7:00 pm – 9:00 pm** **ASNR Education Foundation Dinner**
**King Arthur's Court** *(Ticketed Event)*

**The ASNR Education Foundation Dinner is made possible by the Kessler Foundation.**

The American Society of Neurorehabilitation Research and Education Foundation (ASNREF) was developed as a not-for-profit tax-exempt endowment fund to support research and education in neurorehabilitation. The Foundation was established in honor of Fletcher McDowell, MD, Labe Scheinberg, MD, and Norman Namerow, MD.

The Foundation is a non-profit endowment fund established to support neurorehabilitation research and education. It is with these contributions that the Foundation will continue to flourish; we thank you for your continued support.

To donate to the Foundation, visit www.asnr.com or pick up a donation form at the registration desk during the Annual Meeting.

## KESSLER FOUNDATION NEUROREHABILITATION AWARD

The American Society of Neurorehabilitation Education Foundation grants this award to an individual who has made an outstanding contribution to social and public awareness of Neurorehabilitation. Recipients may be politicians, policymakers, advocates, or other leaders.

2015 Award Recipient

## Ross Mason, MBA

**How to create an ecosystem of innovation and a culture of servant leadership to bridge the gap between innovation and access and improve patient care**

Bill Gates recently said the two greatest problems in global health are the lack of investment in innovation and the lack of access to the solutions that innovation creates. For Ross, this became very personal when he broke his neck in August of 2007 and realized the gap between innovative research and actual solution in the marketplace. The American Medical Association has indicated that it takes 17 years for best practice to become common practice in the healthcare system. Ross is committed to giving patients access to the latest technologies treatments in spinal cord and neurological injuries and other diseases, injuries and illnesses that affect the patient population Using the healthcare ecosystem in Georgia as a working model to implement solutions that can be replicated nationally/globally, Ross created HINRI to bridge the "implementation gap" between innovation and access to improve patient care. Taking business principles from venture capital to aid other nonprofits with raising capital, establishing strategic partnerships, building advisory/governing boards, introducing technology and servant leaders so that they are more effective at saving lives, saving money and having a more sustainable impact, HINRI seeks to address health challenges around the world by identifying, partnering and collaborating with leading innovators, philanthropists, entrepreneurs, nonprofits and policymakers to accelerate the implementation of key solutions to bridge the gap between innovation and access and improve patient care.

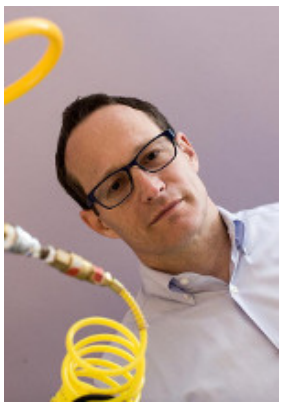
**ASNR Education Foundation Dinner Program**

7:00 pm Opening Remarks: *Krish Sathian, MD, PhD, FAAN*
7:15 pm ASNR Award Winners and Fellows Recognized
7:30 pm Kessler Award Lecture: *Ross Mason, MBA*

# Meeting Program - Friday

**Friday, October 16** **8:00 am – 10:00 am**
**Renaissance**

Symposium #4:
**ASNR/TCMC Joint Session:**
**Applied patient-based motor symposium**
Featured Speakers and Trainee Presentations
*Organized by John Krakauer, MD & Maurice Smith, MD, PhD*



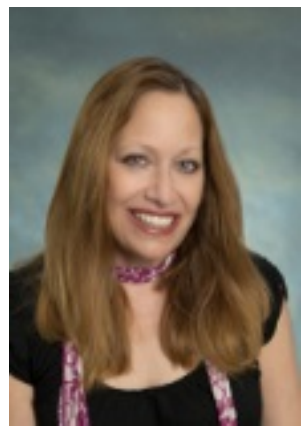
John Krakauer, MD
*John Hopkins University*

Maurice Smith, MD, PhD
*Harvard University*

Friday morning heralds an exciting joint session of the American Society of Neurorehabilitation with the Translational and Computational Motor Control meeting. This session covers clinically related concepts in motor control biology, imaging, circuits, performance and outcomes. Talks from leaders in the field will alternate with those of fellows and graduate students.

**What parietal apraxia reveals about the brain's two action systems**

Patients with limb apraxia due to left inferior parietal lesions show a number of fascinating patterns of performance. Although they perform normally in reaching to and grasping currently visualized objects with their unimpaired left hands, their ability to predict how they would most comfortably position that hand for grasping is markedly impaired. In addition, their ability to pantomime tool use movements and to imitate the actions of others is strikingly abnormal, and they are additionally disrupted by the removal of visual feedback. They also show an abnormal reliance on the three dimensional structure of objects in performing action judgment tasks. These and other data from our lab indicate that a ventro-dorsal stream in the left parietal lobe plays a critical role in the effector-independent simulation of complex movements, as distinguished from a bilateral dorso-dorsal system specialized for current visual control of action.



Laurel Buxbaum, PsyD
*Albert Einstein Healthcare Network*

Bence Ölveczky, PhD
*Harvard University*

**Motor cortex as a 'tutor' for the striatum during motor skill learning**

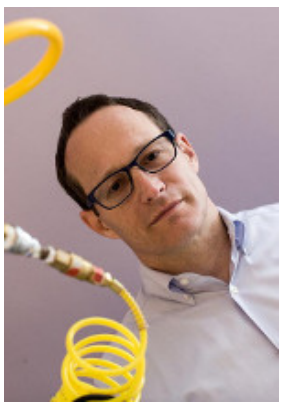
We introduce a new motor skill learning paradigm that trains stereotyped task-specific motor sequences in rodents. We show that motor cortex is essential for learning these skills, but not for executing them. Neural recordings from motor cortex-recipient striatum (dorsolateral striatum, DLS) revealed that DLS neurons encode the learned behavior in a sparse and reliable manner. Lesions to DLS interfered both with motor skill learning and execution, while selective ablation of motor cortical inputs to the striatum abolished learning. Taken together, these results suggest that motor cortex guides plasticity in striatum during skill learning, allowing subcortical motor circuits to autonomously execute learned motor skills.

# Meeting Program - Friday

**Friday, October 16**
**Renaissance**

**12:00 pm – 7:00 pm**

**TCMC Session**
Featured Speakers and Trainee Presentations
*Organized by John Krakauer, MD & Maurice Smith, MD, PhD*



John Krakauer, MD
*John Hopkins University*

Maurice Smith, MD, PhD
*Harvard University*

The Friday afternoon session of TCMC will focus on fundamental issues in motor control and motor learning through a variety of approaches including psychophysics, neurophysiology, imaging, and mathematical modeling.

Jose Carmena, PhD
*University of California – Berkeley*

**Large-Scale Neural Circuit Dynamics During Neuroprosthetic Skill Learning**
We are interested in how sensorimotor skills are learned and consolidated in the brain. We approach this problem using a neuroprosthetic skill learning paradigm. This is a very powerful framework for studying the neural correlates of learning behavior as it offers researchers the unique opportunity to directly control the causal relationship between neuronal activity and behavioral output. In particular, we focus on the question of how neuroplasticity relates to the acquisition and consolidation of neuroprosthetic skills, i.e. accurate, readily-recalled control of disembodied actuators irrespective of natural physical movement. The importance of this question is paramount as it impacts both brain function and dysfunction. In this talk I will present recent work from our laboratory using electrophysiology and imaging techniques in awake behaving primates and rodents, showing that 1) neuroplasticity facilitates consolidation of neuroprosthetic motor skill in a way that resembles that of natural motor learning; 2) corticostriatal plasticity is necessary for neuroprosthetic skill learning, and 3) operant learning occurs through the selection of specific neural patterns via feedback and reinforcement. A greater understanding of the neural substrates of neuroprosthetic skill learning can provide insight into the mechanisms of natural sensorimotor learning as well as help guide the development of neurobiologically-informed neuroprosthetic systems designed to aid people suffering from devastating neurological conditions.

**The cortical hierarchy of motor representations:**
**Decoding the building blocks of motor skill**
Skilled hand movements are generated through coordinated activity across a network of primary and secondary motor areas. What is the role of each of these regions within the cortical control hierarchy? How can we characterise neural representations within each region? In our work, we use multivoxel pattern analysis of fMRI data to describe movement representations across various levels of the motor hierarchy in the human brain. I will present data that argues that the patterns of natural hand use shape the representations of single finger movements in primary motor regions. Building on these elementary representations, our experiments provide new insights into how the motor system represents longer sequences of finger movements, with premotor areas exhibiting representations of transitions between finger presses, as well as of hierarchically organised movement chunks. The ability to elucidate complex representations of motor skills in the human brain promises not only to accelerate our understanding of the neural mechanisms of skill learning, but is also important for translational research into motor disorders.

Jörn Diedrichsen, PhD
*Western University – Ontario*

# Oral Abstract session - Friday

**Friday, October 16** **1:30 pm – 2:30 pm** **Oral Abstracts Session**
**Toledo Ballroom**

## Presenting Authors:

Jessica Livingston-Thomas, PhD

**Assessing Cognitive Function Following Medial Prefrontal Stroke in the Rat**
Cognitive/Language Rehabilitation

Jessica Livingston-Thomas[1,2], Matthew Jeffers[1,2], Carine Nguemeni[1,2], Molly Shoichet[3], Cindi Morshead[3], Dale Corbett[1,2]
*[1]University of Ottawa, Ottawa, ON, Canada, [2]Canadian Partnership for Stroke Recovery, Ottawa, ON, Canada, [3]University of Toronto, Toronto, ON, Canada*

Nathaniel Makowski, PhD

**Improving Walking with an Implanted Pulse Generator for Hip, Knee and Ankle Control After Stroke: A Case Report**
Stroke

Nathaniel Makowski, Rudi Kobetic, Lisa Lombardo, Kevin Foglyano, Gilles Pinaults, Stephen Selkirk, Ronald Triolo
*Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH, USA*

N A Matheson, BSc

**Changes in Synaptic Function and Excitability in Single Neurons Following Transcranial Magnetic Stimulation**
Motor Rehabilitation

N. A. Matheson, J. B. H. Shemmell, P. W. Brownjohn, J. N. J. Reynolds
*University of Otago, Dunedin, New Zealand*

Kelsey Potter-Baker, PhD

**Enhancing Cortical Representational Plasticity with Non-Invasive Direct Current Stimulation to Accelerate Upper Limb Recovery in Quadriplegia**
Motor Rehabilitation

Kelsey Potter-Baker, Daniel Janini, Nicole Varnerin, David Cunningham, Vishwanath Sankarasubramanian, Ken Sakaie, Frederick Frost, Ela Plow
Cleveland Clinic Foundation, Cleveland, OH, USA

## Not Pictured

**Detection and Predictive Value of Fractional Anisotropy Abnormalities in the Acute Stroke Patients**
Stroke

Jasmine Wang, Gottfried Schlaug
Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, MA, USA

**Friday, October 16**
**Toledo Ballroom**

**2:30 pm – 4:00 pm**

Symposium #5:
**Novel Applications of FDA Approved Drugs in Neurologic Rehabilitation**
*Organized by William Zev Rymer, MD, PhD & Rajiv Ratan, MD, PhD*

*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this Symposium*

Willaim Zev Rymer, MD, PhD – Moderator
*Rehabilitation Institute of Chicago*

Rajiv Ratan, MD, PhD
*Burke Rehabilitation Center*

### Repurposing Drugs to Repair the Brain

Exciting studies over the past decade have created momentum around the notion that drugs approved and intended for one clinical indication can be repurposed for other indications. The a priori assumption was that agents with the sanctions of safety from the FDA would move quickly along a translatational pipeline to impact patient care in the near term. However, initial excitement has been met with a number of challenging realities surrounding this approach. In this talk, I will try to inform and outline some of the approaches that have been engaged to repurpose drugs and how these different approaches offer distinct opportunities and pitfalls.

The hope is to provide direction and renewed excitement for those interested in repurposing agents for use in rehabilitation.

### Clinically approved daidzein enhances cholesterol homeostasis via ApoE to promote stroke recovery in mice

Stroke is the leading cause of physiological disability in the world. Currently, no FDA approved pharmacological agents are available for stroke patients to enhance functional recovery. A previous study indicated that daidzein, a soy isoflavone, is a clinically approved agent that is neuroprotective in vitro and promotes axon growth in an animal model of optic nerve crush. In light of the fact that cholesterols play an essential role as lipid substrates in injury-induced synaptic remodeling, this talk will focus on the preclinical findings of daidzein's effect on cholesterol homeostasis and functional recovery in chronic stroke. While daidzein treatment did not reduce stroke-induced injury size, it increased the expression of cholesterol homeostasis genes including apolipoprotein E, an abundant cholesterol transporter in CNS, and also enhanced motor/gait functions in stroke. The daidzein-induced functional benefits were absent in mice that lack ApoE (ApoE knock-out mice). With its apparent safety in humans, these preclinical findings suggest that early and chronic use of daidzein aimed at augmenting cholesterol homeostasis via ApoE may serve as a strategy to promote recovery in stroke patients.

Sunghee Cho, PhD
*Burke Rehabilitation Center*

**Friday, October 16**
**Toledo Ballroom**

**2:30 pm – 4:00 pm**

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**Novel Applications of FDA Approved Drugs in Neurologic Rehabilitation**
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*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this Symposium*

Monica Gorassini, PhD
*University of Alberta*

### Drugs for Motor Rehabilitation - a fine balancing act

Drugs that are used to control spasticity after spinal cord injury may improve motor function, such as walking, to reduce uncontrolled contractions that interfere with purposeful movements. However, anti-spastics that act on motoneurons and sensory pathways may dampen spinal cord excitability and reduce the efficacy of motor driving commands. On the other hand, facilitating motoneuron and sensory pathway excitability may enhance motor movements but at the expense of functional motor control. Thus, strategies that target the facilitation of spinal interneurons involved in driving motor behaviors, such as walking, may be more beneficial to promote motor function by facilitating excitatory networks and at the same time reducing spasticity by facilitating inhibitory networks. I will discuss the mechanisms of various drugs that activate receptors on motoneurons and sensory pathways and potential new therapies that more readily and specifically target spinal interneurons.

T. George Hornby, PhD, PT
*Rehabilitation Institute of Chicago*

### Combined pharmacological and physical interventions following neurological injury

The use of serotonergic agents, such as selective serotonin reuptake inhibitors, to facilitate motor recovery following neurological injury has gained momentum in the past decade. Long-standing and recent studies suggest that SSRIs may enhance motor function, although other data suggest increased spasticity which may hamper recovery. Alternative data suggest serotonin antagonists may reduce spastic motor behaviors, although these agents can result in worsening of selected motor function. While pharmacological agents are typically tested in isolation, our data suggest that the benefits of these agents may depend on the dose of the agents, patient-specific impairments, and the use of these drugs when combined with rehabilitation.

**Friday, October 16**
**Toledo Ballroom**

**2:30 pm – 4:00 pm**

Symposium #5:
**Novel Applications of FDA Approved Drugs in Neurologic Rehabilitation**
*Organized by William Zev Rymer, MD, PhD & Rajiv Ratan, MD, PhD*

*ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this Symposium*

Milap Sandhu, PT, PhD
*Rehabilitation Institute of Chicago*

### Inflammatory suppression augments intermittent hypoxia-induced plasticity in individuals with spinal cord injury

The spinal cord possesses a robust capacity for neuronal plasticity, which could be harnessed to strengthen neural connections and enhance motor function in individuals with spinal cord injury (SCI). One unique approach to induce plasticity is exposure to low-dose acute intermittent hypoxia (AIH)–a treatment modality that constitutes brief periods of reduced oxygen levels, alternating with exposures to normal levels. AIH has been demonstrated to improve leg strength, and over-ground walking ability in persons with chronic, incomplete SCI.

Recent work in animals suggests that intermittent hypoxia-induces spinal plasticity is restricted in the presence of systemic inflammation. As individuals with SCI often have a non-etiological low-grade systemic inflammation, we investigated if a combinatorial approach with anti-inflammatory agents and AIH will have a synergistic impact on plasticity in humans. I will provide evidence that pre-treatment with a single dose of oral prednisolone, a steroidal drug that inhibits several inflammatory pathways, augments the ability of AIH therapy to increase ankle plantar flexion strength. The potential underlying mechanisms and inflammatory pathways involved will also be discussed.

## ASNR Clinical Research Network

ASNR is seeking to facilitate neurorehabilitation research projects that are low cost and easy to implement in clinical practice across multiple sites. The goal of this program is to enhance evidence-based clinical practice as well as to provide training opportunities for junior researchers to work with more experienced researchers. To this end, ASNR solicits proposals from investigators who wish to conduct either descriptive-epidemiological or interventional research that easily fits within normal clinical practice and can be conducted with minimal to no funding. ASNR will review these proposals and will provide the successful applicants with the infrastructure to identify collaborative sites for their project.

Some of the general benefits for junior and senior investigators are the opportunity to collaborate and develop your research skills while, at the same time, advance the field of neurorehabilitation.

If you have a research interest, but know you do not have the patient population at your institution, this might be an opportunity to find appropriate sites for your clinical research ideas.

**Friday, October 16** **4:30 pm – 5:45 pm**
**Toledo Ballroom**

**Controversies in Neurorehabilitation**
*Presented by Carolee Winstein, PhD, PT, FAPTA*
*Moderated by Catherine Lang, PhD, PT*

Clinical care and research in the field of neurorehabilitation is still in its infancy compared to other more established areas of medicine. Over the last decade, results from a handful of Phase II and III RCTs in neurorehabilitation provide new directions and at the same time raise questions and create uncertainty: the pathway forward may not always be so sure. This session will explore new research, clinical ideas and hot topics in neurorehabilitation from the perspective of known leaders in the field and discussion from an expert panel with diverse opinions. For 2015 Dr. Carolee Winstein will present results from the groundbreaking Interdisciplinary Comprehensive Arm Rehabilitation Evaluation (ICARE) Phase III trial, followed by a panel discussion.

Catherine Lang, PhD, PT – Moderator
*Washington University in Saint Louis*

Carolee Winstein
PhD, PT, FAPTA
*University of Southern California*

## Panel:

David Brown, MD
*University of Alabama at Birmingham*

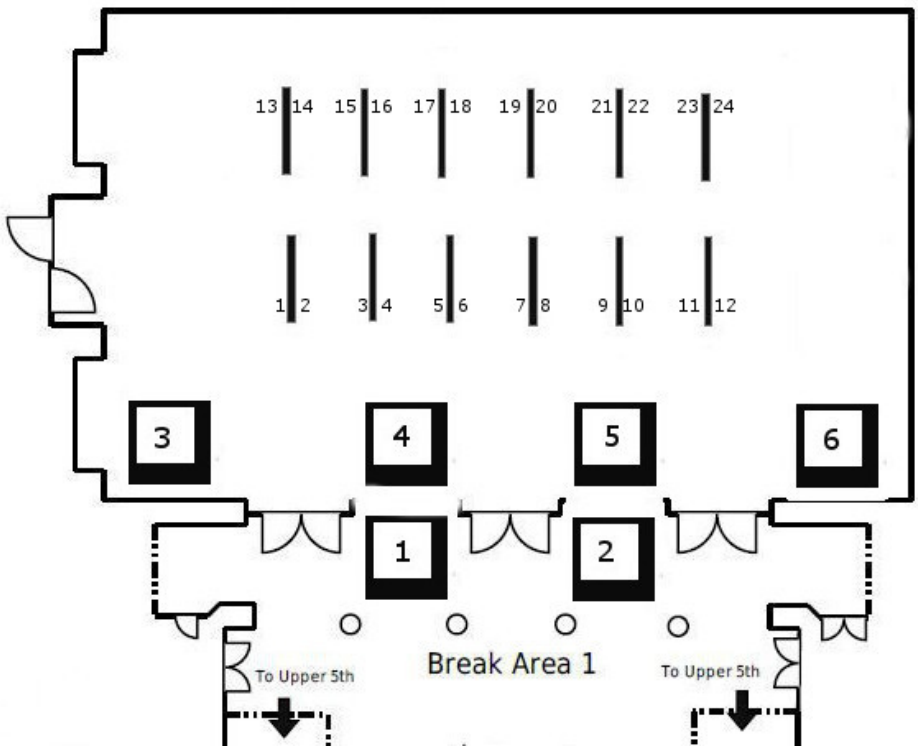
Steven Cramer, MD
*University of California – Irvine*

T. George Hornby, PT, PhD
*Rehabilitation Institute of Chicago*

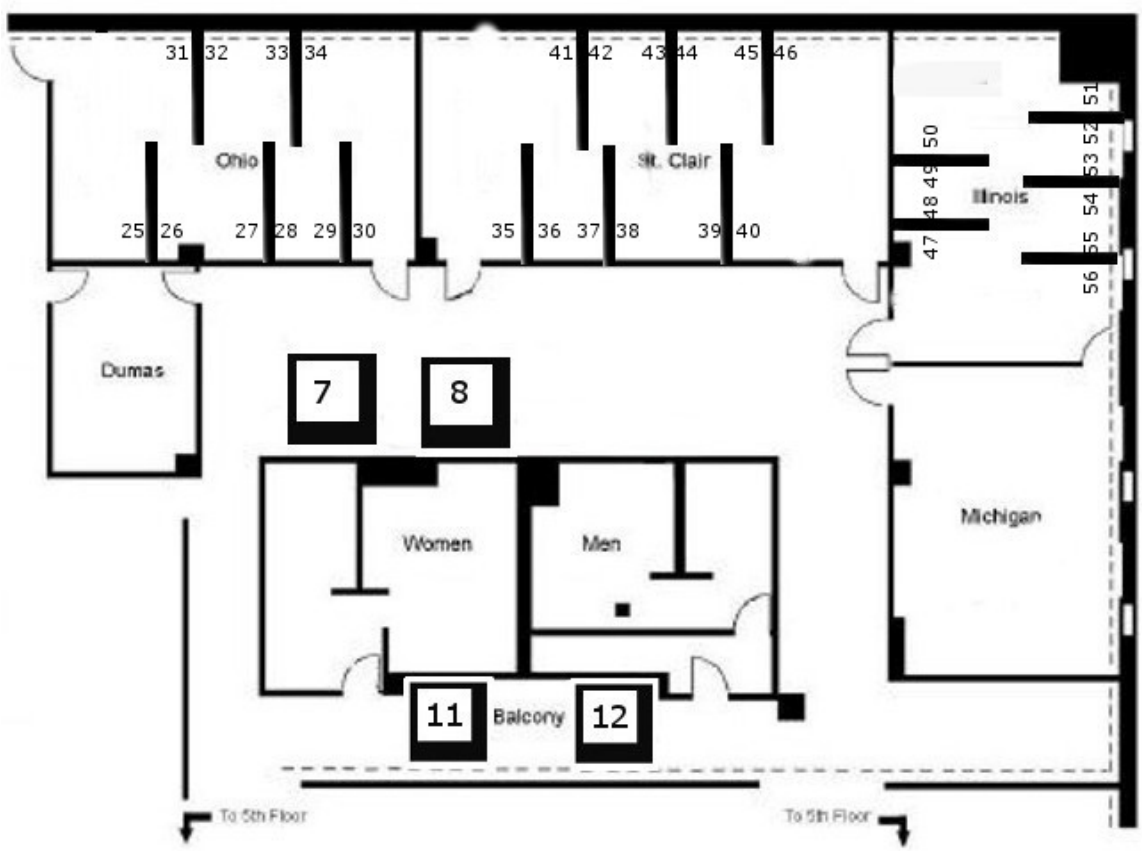
Albert Lo, MD
*Brown University*
*Eli Lilly and Company*

# Poster Sessions & Exhibit Diagrams

**Toledo Ballroom, Lower Level**




**Upper 5th, Balcony**




*Please see pages 41-42 for Exhibitor List*

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T1: Use of Inertial Sensors for Determining Kinematic Characteristics of Infant Leg Movement**
Motor Rehabilitation
Ivan A. Trujillo-Priego, Beth A. Smith
*University of Southern California, Los Angeles, CA, USA*

**Poster T2: Moving Towards Clinical Integration of Accelerometers to Measure Real-World Arm Use After Stroke**
Motor Rehabilitation
Kathryn S Hayward[1,2], Janice J Eng[1,3], Lara A Boyd[1], Bimal Lakhani[1], Julie Bernhardt[2,4], Catherine Lang[5]
*[1]University of British Columbia, Vancouver, Canada, [2]University of Melbourne, Melbourne, Australia, [3]Vancouver Coastal Health Research Institute, Vancouver, Canada, [4]Latrobe University, Melbourne, Australia, [5]Washington University, St Louis, USA*

**Poster T3: Effect of task-specific training on Eph/ephrin expression after stroke**
Neural Repair Mechanisms
Dong-Hee Choi[1,2], Jin-Hee Ahn[1], In-Ae Choi[1], Ji-Hye Kim[1], Jongmin Lee[1,3]
*[1]Center for Neuroscience Research, Institute of Biomedical Science and Technology, Konkuk University, Seoul, Republic of Korea, [2]Department of Medical Science, School of Medicine, Konkuk University, Seoul, Republic of Korea, [3]Department of Rehabilitation Medicine, School of Medicine, Konkuk University, Seoul, Republic of Korea*

**Poster T4: Brain-Computer Interface Assisted Stroke Rehabilitation with Multimodal Feedback**
Motor Rehabilitation
Christoph Guger[1,3], Rupert Ortner[2], Danut Irimia[2]
*[1]g.tec medical engineering GmbH, Schiedberg, Austria, [2]Guger Technologies OG, Graz, Austria, [3]g.tec neurotechnology USA Inc., Albany, USA*

**Poster T5: Awareness Assessment and Communication Tool for Patients with Disorders of Consciousness**
Disorders of Consciousness
Christoph Guger[1,3], Rupert Ornter[2]
*[1]g.tec medical engineering GmbH, Schiedlberg, Austria, [2]Guger Technologies OG, Graz, Austria, [3]g.tec neurotechnology USA Inc., Albany, USA*

**Poster T6: Two-Week Administration of Neuropathic Pain Medications Fails to Prevent the Development of Cutaneously Evoked Autonomic Dysreflexia After High Thoracic Spinal Cord Transection in Rats**
SCI
Keith Tansey, Jumi Chung, Hyun Joon Lee
*Emory University/Atlanta VA, Atlanta, GA, USA*

**Poster T7: Sildenafil for Stroke Recovery**
Stroke
Christopher Walter, Steven Edgley, Jacob Smith, Mary Paulter, Lorie Richards
*University of Utah, Salt Lake City, USA*

**Poster T8: Targeted Memory Reactivation to Improve Motor Learning**
Motor Rehabilitation
Brian Johnson[1], Steven Scharf[2,3], Kelly Westlake[1]
*[1]University of Maryland School of Medicine, Department of Physical Therapy & Rehabilitation Science, Baltimore, Maryland, USA, [2]University of Maryland Sleep Disorders Center, Baltimore, Maryland, USA, [3]University of Maryland Medical Center, Division of Pulmonary and Critical Care Medicine, Baltimore, Maryland, USA*

Full abstracts can be found at www.asnr.com

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T9: Centralized Open-Access Research (COAR): A Database for Stroke Rehabilitation**
Motor Rehabilitation
Keith Lohse[1], Lara Boyd[2], Catherine Lang[3]
*[1]Auburn University, Auburn, Alabama, USA, [2]University of British Columbia, Vancouver, British Columbia, Canada, [3]Washington University School of Medicine, St. Louis, Missouri, USA*

**Poster T10: Exercise, Cognition and Brain Imaging in Parkinsonism - Study Design**
Motor Rehabilitation
Katrijn Smulders[1], Laurie King[1], Martina Mancini[1], Daniel Peterson[1,2], Patricia Carlson-Kuhta[1], John Nutt[1], Brett Fling[1], Fay Horak[1,2]
*[1]Oregon Health & Science University, Portland, OR, USA, [2]VA Portland Health Care Systems, Portland, OR, USA*

**Poster T11: Freezing of Gait in Parkinson's Disease: A Stopping Deficit?**
Motor Rehabilitation
Katrijn Smulders[1], Daniel Peterson[1,2], John Nutt[1], Fay Horak[1,2], Brett Fling[1]
*[1]Oregon Health & Science University, Portland, OR, USA, [2]Portland VA Medical Center, Portland, OR, USA*

**Poster T12: Upper Extremity Functional Evalulation by Virtual Fugl-Meyer Assessment Using Kinect in Hemiplegic Stroke Patients**
Stroke
Won-Seok Kim[1], Sungmin Cho[2], Hyunwoo Bang[2], Nam-Jong Paik[1]
*[1]Department of Rehabiliation Medicine, Seoul National University Bundang Hospital, Seongnam-si, Gyeonggi-do, Republic of Korea, [2]School of Mechanical and Aerospace Engineering, Seoul National University, Seoul, Republic of Korea*
**Support:** by the MSIP (The Ministry of Science, ICT and Future Planning), Korea and Microsoft Research, under ICT/SW Creative research program supervised by the NIPA(National ICT Industry PromotionAgency) (NIPA-2014-(H0510-14-1014))

**Poster T13: Hebbian-Type Motor Cortex Stimulation Promotes Motor Learning in Chronic Stroke Patients**
Stroke
Julianne Freeman[1], Gregory Kowalski[1], Kate Revill[1], Marc Haut[2], Samir Belagaje[1], Gerald Hobbs[2], Cathrin Buetefisch[1]
*[1]Emory University, Atlanta, GA, USA, [2]West Virginia University, Morgantown, WV, USA*

**Poster T14: Capturing Recovery Potential After Severe Stroke: How Individuality Drives the Need for a Multimodal Approach**
Stroke
Kathryn S Hayward[1,2], Sue Peters[1], Jason L Neva[1], Katie P Wadden[1], Lara A Boyd[1]
*[1]University of British Columbia, Vancouver, Canada, [2]University of Melbourne, Melbourne, Australia*

**Poster T15: Refinement of the PREP Algorithm for Predicting Recovery of Upper Limb Function After Stroke**
Stroke
Cathy Stinear[1], Suzanne Ackerley[1], Winston Byblow[1], Alan Barber[1,2], Anna McRae[2], Henrietta Lee[1]
*[1]University of Auckland, Auckland, New Zealand, [2]Auckland District Health Board, Auckland, New Zealand*

Full abstracts can be found at www.asnr.com

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T16: Post Stroke Sensory Loss is Associated Self-reported Functional Status and Changes in Gait Speed Following Intervention Post Stroke Sensory Loss is Associated Self-reported Functional Status and Changes in Gait Speed Following Intervention**

Stroke

Jane E. Sullivan, Roberto Lopez-Rosado

*Northwestern University, Chicago, Il, USA*

**Poster T17: Deficits in Visual Search Contribute to Impaired Visuomotor Processing and Executive Function Following Stroke**

Stroke

Tarkeshwar Singh, Christopher Perry, Angela Ross, Julius Fridriksson, Stacy Fritz, Troy Herter

*University of South Carolina, Columbia, USA*

**Poster T18: Is Infarct Location a Predictor of the Degree of Post-Stroke Motor Recovery?**

Motor Rehabilitation

Sudhir Karthikeyan[1], Matthew Jeffers[1], Anthony Carter[1,2], Dale Corbett[1,2]

*[1]University of Ottawa, Ottawa, Canada, [2]Canadian Partnership for Stroke Recovery, Ottawa, Canada*

**Poster T19: Sensory-Driven Motor Recovery in Poorly Recovered Subacute Stroke Patients**

Stroke

Cheryl Carrico[1], Kenneth C. Chelette[1], Elizabeth Salmon-Powell[1], Laurie Nichols[1], Emily Salyers[1], Lumy Sawaki[1]

*[1]University of Kentucky, Lexington, KY, USA, [2]Cardinal Hill Hospital, Lexington, KY, USA*

**Poster T21: Does the Attentional Status Affect the Efficacy of the Neurofeedback-Based Rehabilitation?: Preliminary Analysis Using Functinoal-NIRS-Mediated (Neurofeedback) System**

Neural Repair Mechanisms

Hiroaki Fujimoto[1], Masahito Mihara[2], Noriaki Hattori[1], Megumi Hatakenaka[1], Hajime Yagura[1], Teiji Kawano[1], Hideki Mochizuki[2], Ichiro Miyai[1]

*[1]Morinomiya Hospital, Osaka, Japan, [2]Osaka University, Suita, Osaka, Japan*

**Poster T22: Effectiveness of Active Pedaling Combined with Sensory Electrical Stimulation on Gait Performance in Subacute Stroke Patients: A Multicenter, Sham-Controlled Randomized Controlled Trial**

Motor Rehabilitation

Koki Ikuno[1,2], Tomofumi Yamaguchi[3], Ken Fuchigami[2,4], Soichiro Koyama[5], Hiroyuki Kobayashi[6], Masaki Kitaura[7], Saori Kawaguchi[8], Kanako Fujikawa[9], Hikaru Matsunaga[10]

*[1]Nishiyamato Rehabilitation Hospital, Kanmaki-cho, Nara, Japan, [2]Kio University, Koryo-cho, Nara, Japan, [3]Keio University School of Medicine, Shinjuku-ku, Tokyo, Japan, [4]Kishiwada Eishinkai Hospital, Kishiwada-shi, Osaka, Japan, [5]Kawamura Hospital, Gifu-shi, Gifu, Japan, [6]Sumiya Rehabilitation Hospital, Wakayama-shi, Wakayama, Japan, [7]Wakayama Physical Therapy College, Wakayama-shi, Wakayama, Japan, [8]Terashita Hospital, Wakayama-shi, Wakayama, Japan, [9]Kyowakai Hospital, Suita-shi, Osaka, Japan, [10]Tokyo Bay Rehabilitation Hospital, Narashino-shi, Chiba, Japan*

**Poster T23: Prevalence of Growth Hormone Deficiency in Chronic Traumatic Brain Injury**

TBI

Lisa Kreber, Grace Griesbach, Mark Ashley

*Centre for Neuro Skills, Bakersfield, CA, USA*

Full abstracts can be found at www.asnr.com

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T24: Study Design: Identifying Carpal Tunnel Syndrome in Stroke Recovery using Ultrasound**
Peripheral Nerve/Plexus/Neuromuscular Diseases
Chen Lin, Aaron Loochtan, Lisa Hobson-Webb
*Duke University, Durham, NC, USA*

**Poster T25: Comparing Stimulation of Bihemispheric Motor Sites on a Reaching Task in Mild and Severe Arm Impairment After Stroke**
Stroke
Rachael Harrington[1,2], Evan Chan[3], Sambit Mohapatra[1,2], Clinton J. Wutzke[2,5], Amanda K. Rounds[2,4], Dijo Abraham[2], Michelle L. Harris-Love[1,2]
*[1]Georgetown University, Washington, DC, USA, [2]Medstar National Rehabilitation Hospital, Washington, DC, USA, [3]Medstar Health Research Institute, Washington, DC, USA, [4]George Mason University, Fairfax, VA, USA, [5]Veterans Affairs, Washington, DC, USA*

**Poster T26: A Constrained Motor Connectome Characterizes Post-Stroke Upper Extremity Motor Function**
Stroke
Sue Peters, Katie Wadden, Kathryn Hayward, Jason Neva, Lara Boyd
*University of British Columbia, Vancouver, BC, Canada*

**Poster T27: Effect of Taping on Hand Functions in Spastic Hemiplegic Children.**
Motor Rehabilitation
Mohammed Ata[1]
*[1]Faculty of physical therapy - Cairo University, Cairo, Egypt, [2]Faculty of physical therapy - Pharos University, Alexandria, Egypt*

**Poster T28: Impact of Motor Practice on Neuromodulation for Stroke Rehabilitation**
Motor Rehabilitation
Caylen White[1,2], Damian Funke[1,2], Crystal Massie[1,2]
*[1]Indiana University, Indianapolis, IN, USA, [2]Indiana Center for Advanced Neurorehabilitation, Indianapolis, IN, USA*

**Poster T29: Bilateral vs. Unilateral Therapy for Chronic Stroke Patients with Varying Degrees of Motor Impairment: A Crossover Repeated-Measures Design of Neurophysiologic Response**
Stroke
David Cunningham[1,2], Jayme Knutson[3], Kelsey Potter-Baker[1], Vishwanath Sankarasubramanian[1], Nicole Varnerin[1], Corin Bonnett[1], Thelma Asare[1], Andre Machado[1], Ela Plow[1]
*[1]Cleveland Clinic, Cleveland, Ohio, USA, [2]Kent State University, Kent, Ohio, USA, [3]Case Western Reserve University, Cleveland, Ohio, USA*

**Poster T30: Clinically Approved Daidzein Improves Ipsilesional Visual Acuity in Subcortical Stroke in Mice**
Stroke
Glen Prusky, Nazia Alam, Sangram Bhosle, Sunghee Cho
*Burke Med Research Institute/Weill Cornell Medical College, White Plains New York, USA*

**Poster T31: Improved Upper Limb Skilled Functional Task Performance is Predicted by Mitigated Spasticity in Response to Intensive Motor Learning Therapy in Chronic Stroke Survivors**
Motor Rehabilitation
Svetlana Pundik[1,2], Jessica McCabe[2], Margaret Skelly[2], Curtis Tatsuoka[1], Janis Daly[3,4]
*[1]Case Western Reserve University, Cleveland, OH, USA, [2]Cleveland VA Medical Center, Cleveland, OH, USA, [3]McKnight Brain Institute, University of Florida, Gainesville, FL, USA, [4]Brain Rehabilitation Research Center of Excellence VA Medical Center, Gainesville, FL, USA*

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T32: Contralaterally Controlled Functional Electrical Stimulation and Hand Therapy Video Games for Cerebral Palsy**

Motor Rehabilitation

Michael Fu[1,2], Anna Curby[3], Ryan Suder[3], John Chae[2,4], Jayme Knutson[2,4]

*[1]Case Western Reserve University, Cleveland, OH, USA, [2]Cleveland FES Center of Excellence,, Cleveland, OH, USA, [3]Cleveland Clinic Children's Hospital for Rehabilitation, Cleveland, OH, USA, [4]MetroHealth Rehabilitation Institute of Ohio, Cleveland OH, USA*

**Poster T33: Connections Between Posterior Parietal and Sensorimotor Cortices Predict Postural Adaptation in People with Multiple Sclerosis**

MS

Eline Zeeboer[1], Geetanjali Gera Dutta[1], Heather Schlueter[1], Fay B. Horak[1,2], Brett W. Fling[1]

*[1]Oregon Health & Science University, Portland, Oregon, USA, [2]VA Portland Healthcare System, Portland, Oregon, USA*

**Poster T34: Activation Training Alters Corticomotor Excitability of the Gluteus Maximus**

Motor Rehabilitation

Yi-Ling Kuo[1], Christopher Powers[1], Anna Southam[1], Ya-Yun Lee[1,2], Beth Fisher[1]

*[1]University of Southern California, Division of Biokinesiology and Physical Therapy, Los Angeles, USA, [2]Healthy Aging Center, Chang Gung University, Taoyuan, Taiwan*

**Poster T35: Methodological Study to Identify Trunk and Hip Muscle Representation in Motor Cortex**

Motor Rehabilitation

Alaa Albishi, Jo Armour Smith, Beth Fisher

*usc, los Angeles/ CA, USA*

**Support:** Funding from the Neuroplasticity and Imaging Laboratory in the Division of Biokinesiology and Physical Therapy at USC.

**Poster T36: The Efficacy of Wii-Based Movement Therapy Upper-Limb Rehabilitation in Chronic Stroke is Accompanied by Ancillary Cardiovascular Benefits**

Motor Rehabilitation

Penelope McNulty[1,2], Angelica Thompson-Butel[1,2], Terry Trinh[1,2], Steven Faux[2,3], Gaven Lin[1], Christine Shiner[1,2]

*[1]Neuroscience Research Australia, Sydney, NSW, Australia, [2]UNSW Australia, Sydney, NSW, Australia, [3]St Vincent's Hospital, Sydney, NSW, Australia*

**Poster T37: Optimal Timing for Combined Neuromodulation Techniques to Enhance Motor Training in Chronic Stroke with Severe Motor Deficit**

Motor Rehabilitation

Elizabeth Powell[1], Cheryl Carrico[1], Kenneth Chelette[1], Laurie Nichols[1,2], Emily Salyers[1], Lakshmi Reddy[2], Lumy Sawaki[1,2]

*[1]University of Kentucky, Lexington, KY, USA, [2]Cardinal Hill Rehabilitation Hospital, Lexington, KY, USA*

**Poster T38: Biomarkers of Stroke Recovery Study (BIOREC) Methodology**

Neural Repair Mechanisms

Matthew Edwardson[1,2], Shashwati Geed[2], Amrita Cheema[1], Ming Tan[1], Barbara Bregman[1,2], Alexander Dromerick[2,1]

*[1]Georgetown University, Washington, DC, USA, [2]National Rehabilitation Hospital, Washington, DC, USA*

**Support:** Grant 1U10NS086513-01.

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T39: Investigating Dynamics of Motor Evoked Potentials During Isometric Contraction**
Motor Rehabilitation
Michael Dimyan[1,4], Elsa Ermer[1,4], George Wittenberg[1,4]
*[1]University of Maryland School of Medicine, Baltimore, MD, USA, [2]University of Maryland Rehabilitation & Orthopedic Institute, Baltimore, MD, USA, [3]University of Maryland Pepper Center, Baltimore, MD, USA, [4]VA Maryland Health Care System, Baltimore, MD, USA*

**Poster T40: Intensive Home-Based Prism Adaptation Treatment for Chronic Spatial Neglect: A Case Study with Bilateral Lesions**
Neural Repair Mechanisms
Peii Chen, Meghan Caulfield
*Kessler Foundation, West Orange, New Jersey, USA*

**Poster T41: Condition-Specific Deficits in Intersegmental Coordination After Stroke**
Stroke
Krithika Sambasivan[1,2], Katherine Haentjens[3], Sajida Khanafer[4], Sandeep K Subramanian[2,5], Melanie C Banina[2], Anatol G Feldman[5], Heidi Sveistrup[6,7], Mindy F Levin[1,2]
*[1]School of Physical and Occupational Therapy, McGill University, Montreal, QC, Canada, [2]Jewish Rehabilitation Hospital, Centre for Interdisciplinary Research in Rehabilitation in Greater Montreal Area (CRIR), Laval, QC, Canada, [3]Bachelor in Neuroscience, McGill University, Montreal, QC, Canada, [4]School of Human Kinetics, University of Ottawa, Ottawa, ON, Canada, [5]Department of Neuroscience, University of Montreal, Montreal, QC, Canada, [6]School of Rehabilitation Sciences, University of Ottawa, Ottawa, ON, Canada, [7]Elisabeth Bruyere Hospital, Ottawa, ON, Canada*

**Poster T42: Temporal and Spatial Upper-Limb Interjoint Coordination in Chronic Stroke Subjects Versus Healthy Individuals When Reaching**
Stroke
Marcos R M Rodrigues[1,2], Matthew Slimovitch[2,4], Andreanne K Blanchette[2,3], Mindy F Levin[1,2]
*[1]School of Physical and Occupational Therapy, McGill University, Montreal, QC, Canada, [2]Feil and Oberfeld Research Center, Jewish Rehabilitation Hospital, Center for Interdisciplinary Research in Rehabilitation of the Greater Montreal (CRIR), Laval, QC, Canada, [3]Department of Rehabilitation, Laval University, Quebec, QC, Canada, [4]Faculty of Medicine, McGill University, Montreal, QC, Canada*

**Poster T43: Motor Equivalence During Whole Body Reaching In Healthy Young Adults**
Motor Rehabilitation
Yosuke Tomita[1,2], Anatol Feldman[2,3], Mindy Levin[1,2]
*[1]McGill University, School of Physical and Occupational Therapy, Montréal, Canada, [2]Center for Interdisciplinary Research in Rehabilitation (CRIR)-Jewish Rehabilitation Hospital, Laval, Canada, [3]Université de Montréal, Département de neuroscience, Montréal, Canada*

**Poster T44: Effects of Positioning Exercise On Locomotor Function After Contusive Spinal Cord Injury in Rats**
Motor Rehabilitation
Eseul Song[1,3], Hochung Jeon[1,3], Sunk-Chan Hahm[1,3], Youngkyung Kim[2], Young Wook Yoon[2], Junesun Kim[1,3]
*[1]College of health science, Korea University, Seoul, Republic of Korea, [2]Collge of Medicine, Korea University, Seoul, Republic of Korea, [3]Department of Public Health Science, Graduate School of Korea University, Seoul, Republic of Korea*
**Support:** The convergence technology development program for bionic arm through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT& Future Planning (2014M2C1B2048632).

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T45: Effects of Transcutaneous Electrical Nerve Stimulation (TENS) on Hand Dexterity in Chronic Acquired Brain Injury**

Motor Rehabilitation

Adelyn Tsu[1,2], Jason Godlove[1,2], Gary Abrams[1,2], Karunesh Ganguly[1,2]

*[1]San Francisco VA Medical Center, San Francisco, CA, USA, [2]University of California San Francisco, San Francisco, CA, USA*

**Poster T46: Sensorimotor Changes After an Intervention Using a Novel Assistive System – Rein Hand: A Case Report**

Motor Rehabilitation

Jun Yao, Natalia Sanchez, Meriel Owen, Carolina Caramona, Jane Sullivan, Julius Dewald

*Northwestern University, Chicago, IL, USA*

**Poster T47: Different Levels of Intracortical Inhibition are Involved in Bimanual Common vs. Dual-Goal Tasks and Related to Interlimb Interaction**

Stroke

Wan-Wen Liao[1], Jill Whitall[1,2], Joseph Barton[1,3], Sandy McCombe-Waller[1]

*[1]Department of Physical Therapy and Rehabilitation Science, School of Medicine, University of Maryland, Baltimore, MD, USA, [2]Faculty of Health Sciences, Southampton, UK, [3]Department of Neurology, School of Medicine, University of Maryland, Baltimore, MD, USA*

**Poster T49: Navigated Repetitive Transcranial Magnetic Stimulation of Pre-Supplementary Motor Area on Fronto Basal Ganglia Network to Treat Frontal Lobe Stereotypy Following Traumatic Brain Injury : A Case Report**

TBI

Hoo Young Lee, Tae Woo Kim, Yoon Tae Kim, Soon Hyun Lee, Sang Kyu Shin

*National Traffic Rehabilitation Hospital, Catholic Medical Center, Gyeonggi-do, Republic of Korea*

**Poster T50: Corticospinal Resetting of the Threshold (Referent) Position for Activation of Muscles During Motion at the Elbow Joint**

Stroke

Sandeep Subramanian[1,6], Laetitia Rodrigues[2,6], Louis Ryckembusch[2,6], Tara Brohman[3,6], Dorothy Barthelemy[4,6], Mindy Levin[5,6], Anatol Feldman[1,6]

*[1]Neurosciences, Univ. De Montréal, Montreal, Quebec, Canada, [2]Biomed. Engin., Univ. Paris Descartes, Paris, France, [3]Inst. de génie biomédical, Univ. de Montréal, Montreal, Quebec, Canada, [4]École de réadaptation, Univ. De Montréal, Montreal, Quebec, Canada, [5]Sch. of Physical and Occup. Therapy, McGill University, Montreal, Quebec, Canada, [6]Ctr. for Interdisciplinary Res. in Rehabil. of Greater Montreal (CRIR), Montreal, Quebec, Canada*

**Poster T52: Quantifying Post-Stroke Apathy with Actimeters**

Cognitive/Language Rehabilitation

Andrew Goldfine[1], Behdad Dehbandi[2], Juliana Kennedy[2], Briana Sabot[2], Cory Semper[2], David Putrino[2]

*[1]Stony Brook Medicine, Stony Brook, NY, USA, [2]Burke Medical Research Institute, White Plains, NY, USA*

**Poster T53: Effect of Creatine Supplementation on Cognition During Hypoxia in Mild Traumatic Brain Injury**

TBI

Clare Turner, Winston Byblow, Suzanne Barker-Collo, Robert Kydd, Nicholas Gant

*Centre for Brain Research, The University of Auckland, Auckland, New Zealand*

**Thursday, October 15** **10:00 am – 12:00 pm** **Poster Session I**

**Poster T54: Assessment of Executive Function in Acute Rehabilitation Inpatients Using Hands-Free Cognitive Tests**

Cognitive/Language Rehabilitation

Avantika Naidu, Victor Mark, Byron Lai

*University of Alabama at Birmingham(UAB), ALABAMA, USA*

**Poster T55: Control of Posture and Movement with Respect to Gravity by Setting the Referent Orientation of the Body**

Motor Rehabilitation

Aditi Mullick[1,3], Szu-Chen Hsu[2,3], Sandeep Subramanian[3,4], Nicolas Turpin[3,5], Anatol Feldman[3,4], Mindy Levin[1,3]

*[1]School of Physical and Occupational Therapy, McGill University, Montreal, QC, Canada, [2]Neuroscience Program, McGill University, Montreal, QC, Canada, [3]Center for Interdisciplinary Research in Rehabilitation of Greater Montreal (CRIR), Laval, QC, Canada, [4]Department of Neuroscience, Université de Montréal, Montreal, QC, Canada, [5]School of Rehabilitation, Université de Montréal, Montreal, QC, Canada*

**Poster T56: Improving Motor Function After Stroke by Application of Electrical Theta-Burst Stimulation via Implanted Electrodes**

Motor Rehabilitation

Laura Boddington, Jason Gray, John Reynolds

*Department of Anatomy, Brain Health Research Centre, University of Otago, Dunedin, Otago, New Zealand*

**Friday, October 16** **10:00 am – 12:00 pm** **Poster Session II**

**Poster F1: Anxiety and Depression in Patients with Malformations of Cortical Development and Incomplete Hippocampal Inversion**
Cognitive/Language Rehabilitation
Bhoopathy R M, Arthy B, Vignesh S S, Srinivasan A V
*Madras Medical College, chennai, India*

**Poster F2: Increased Interhemispheric Coherence During Transcallosal Inhibition Assessment in Chronic Stroke: A Preliminary TMS-EEG Investigation**
Stroke
Michael Borich[1], Lewis Wheaton[2], Sonia Brodie[3], Bimal Lakhani[3], Lara Boyd[3]
*[1]Emory University, Atlanta, Georgia, USA, [2]Georgia Institute of Technology, Atlanta, Georgia, USA, [3]University of British Columbia, Vancouver, British Columbia, Canada*

**Poster F3: Effect of Resveratrol on Relapsing-Remitting Multiple Sclerosis**
MS
Matthew Davis[2], Pradeep Sahota[1, 2] Mahesh Thakkar [1, 2]

*[1] Harry S. Truman Memorial Veterans Hospital, [2]University of Missouri School of Medicine, Columbia, MO, USA*

**Poster F4: The Effect of Antispasmodic Medications on Recovery During Inpatient Rehabilitation After Acute Traumatic Spinal Cord Injury**
SCI
Eric R. Theriault[1,4], Vincent Huang[2], Gale Whiteneck[3], Marcel P. Dijkers[2], Noam Y. Harel[2,4]
*[1]New York Institute of Technology, Old Westbury, NY, USA, [2]Icahn School of Medicine at Mount Sinai, New York, NY, USA, [3]Craig Hospital, Englewood, CO, USA, [4]James J. Peters VA Medical Center, Bronx, NY, USA*
**Support:** NIDRR grants H133A060103, H133N060027, and VA RR&D grant B0881-W.

**Poster F5: Paired Stimulation to Increase Cortical Transmission to Hand Muscles**
SCI
Lok Yung[1], Shivani Kastuar[2], Jason B. Carmel[3], Ann M. Spungen[1,2], William A. Bauman[1,2], Noam Y. Harel[1,2]
*[1]James J. Peters VA Medical Center, Bronx, NY, USA, [2]Icahn School of Medicine at Mount Sinai, New York, NY, USA, [3]Burke Medical Research Institute, White Plains, NY, USA*
**Support:** VA RR&D grants B0881-W and B9212-C.

**Poster F6: Threshold Position Resetting Suppressing both Stretch Reflexes and Background Muscle Activity in Response to Prolong Muscle Lengthening**
Motor Rehabilitation
Nicolas Turpin[1,3], Rim Rahal[1,3], Sandeep Subramanian[2,3], Mindy Levin[2,3], Anatol Feldman[1,3]
*[1]Department of Neuroscience, Université de Montréal, Montréal, Canada, [2]School of Physical and Occupational Therapy, McGill University, Montréal, Canada, [3]Center for Interdisciplinary Research in Rehabilitation of Greater Montreal, Montréal, Canada*

**Poster F7: Track-Weighted Functional Connectivity in the Sensory Discrimination Network Correlates with Haptic Performance: A Preliminary Study in Stroke**
Neural Repair Mechanisms
Alexandra Borstad, Petra Schmalbrock, Deborah Nichols-Larsen
*The Ohio State University, Columbus, OH, USA*

Full abstracts can be found at www.asnr.com

**Poster F8: Does Delayed Peroneal Activation in Response to a Sudden Underfoot Perturbation during Gait Predict Injurious Falls in the Elderly with Diabetic Peripheral Neuropathy?**

Peripheral Nerve/Plexus/Neuromuscular Diseases

Hogene Kim[3], Lara Allet[4], Trina DeMott[2], James. K. Richardson[2], James. A. Ashton-Miller[1]

*[1]University of Michigan, Department of Mechanical Engineering, Ann Arbor, MI, USA, [2]University of Michigan Health System, Department of Physical Medicine & Rehabilitation, Ann Arbor, MI, USA, [3]National Rehabilitation Center, Seoul, Republic of Korea, [4]Hôpitaux Universitaires de Genève, Geneva, Switzerland*

**Support:** This study was supported by grants from the National Institutes of Health (R01 AG026569-01) and the Public Health Service (P30AG024824).

**Poster F9: Neural Correlates of Attentional Demands Associated with Dual-Task Walking**

Motor Rehabilitation

Samir Sangani[1], Taichi Kurayama[2], Joyce Fung[1,3]

*[1]Jewish Rehabilitation Hospital, Feil/Oberfeld/CRIR Research Centre, Laval, Quebec, Canada, [2]Chiba University, Chiba, Japan, [3]McGill University, School of Physical and Occupational Therapy, Montreal, Quebec, Canada*

**Poster F10: Intensive Upper Limb Neurorehabilitation with Virtual Reality in Chronic Stroke: A Case Report**

Motor Rehabilitation

Odile Chevalley[1], Thomas Schmidlin[2], Daniel Perez-Marcos[3], Gangadhar Garipelli[3], Robert Leeb[2], Cyntia Duc[3], Ron Vollen[3], Philippe Vuadens[4], Tej Tadi[3], Olaf Blanke[1,2], José d.R. Millán[2,5]

*[1]Laboratory of Cognitive Neuroscience, Brain-Mind Institute, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, [2]Center for Neuroprosthetics, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, [3]MindMaze SA, Ecublens, Switzerland, [4]Clinique Romande de Réadaptation, Sion, Switzerland, [5]Chair in Brain-Machine Interface, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*

**Poster F11: Task-Oriented Arm Training in Standing Improves Both Anticipatory Postural Control and Upper Extremity Functional Outcomes in Stroke Patients**

Motor Rehabilitation

Sandy McCombe Waller, Chieh-ling Yang, Wan-wen Liao, Rogers Mark

*University of Maryland Baltimore, Baltimore, MD, USA*

**Poster F12: Improved Interhemispheric Inhibition After 12-weeks of Cardiovascular Exercise**

Motor Rehabilitation

Keith McGregor[1,2], Joe Nocera[1,2], Bruce Crosson[1,2], Andrew Butler[1,3]

*[1]Center for Neurocognitive and Visual Rehabilitation, Atlanta VAMC,, Decatur, GA, USA, [2]Emory University, Department of Neurology, Dectur, GA, USA, [3]Georgia State University, Department of Physical Therapy, Atlanta, GA, USA*

**Poster F13: Improvements in Visual Search Contribute to Visuomotor Learning**

Motor Rehabilitation

Christopher Perry[1], Tarkeshwar Sighn[1], Kayla Goins[1], Barbara Marebwa[2], Troy Herter[1]

*[1]University of South Carolina, Columbia, SC, USA, [2]University of Trento, Trento, Italy*

**Poster F14: Comparing Three Dual-Task Methods and the Relationship to Physical and Cognitive Impairment in People With MS and Controls**

MS

Megan Kirkland, Elizabeth Wallack, Samantha Rancourt, Michelle Ploughman

*Memorial University, St. John's, Canada*

**Friday, October 16** **10:00 am – 12:00 pm** **Poster Session II**

**Poster F15: An Interprofessional Case Study: Training Health Profession Students in Clinical Exercise Therapy for People with Parkinson's Disease**
Motor Rehabilitation
Theresa Sweeny, Rebecca States, Amerigo Rossi
*Long Island University (LIU), Brooklyn, NY, USA*

**Poster F16: Evidence for Interhemispheric Reorganization in Sensory Cortex Following Unilateral Upper Extremity Amputation in Humans**
Motor Rehabilitation
Benjamin Philip[1,2], Scott Frey[1,2]
*[1]Washington University, St. Louis, MO, USA, [2]University of Missouri, Columbia, MO, USA*

**Poster F17: Manual Asymmetry During a Bilateral Reach and Hold Task**
Motor Rehabilitation
Elizabeth J. Woytowicz[1], Jill Whitall[1,2], Kelly Westlake[1], Robert L. Sainburg[3,4]
*[1]University of Maryland School of Medicine, Baltimore, MD, USA, [2]University of Southampton, Southampton, England, UK, [3]Penn State Milton S. Hershey Medical Center and College of Medicine, Hershey, Pennsylvania, USA, [4]Penn State University, University Park, Pennsylvania, USA*

**Poster F18: Modulating Transcallosal and Intrahemispheric Brain Connectivity with Transcranial Direct Current Stimulation (tDCS)**
Neural Repair Mechanisms
Xin Zheng, Gottfried Schlaug
*Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, MA, USA*

**Poster F19: Right Hemisphere Structures Predict Post-Stroke Speech Fluency**
Cognitive/Language Rehabilitation
Ethan Pani, Xin Zheng, Andrea Norton, Jasmine Wang, Gottfried Schlaug
*Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, USA*

**Poster F20: Effectiveness of Modified Constraint Induced Movement Therapy in a Group Setting as Compared to Individual on the Quality and Quantity of Upper Extremity Movement Recovery After Stroke**
Stroke
Rodrigo Rivas[1,2], Arlette Doussoulin[3], José Luis Saiz[4], Sarah Blanton[5]
*[1]Universidad de La Frontera, Departamento de Especialidades Médicas, Temuco, Chile, [2]Clínica Alemana Temuco, Servicio de Medicina Física y Rehabilitación, Temuco, Chile, [3]Universidad de La Frontera, Departamento de Pediatría y Cirugía Infantil, Temuco, Chile, [4]Universidad de La Frontera, Departamento de Psicología, Temuco, Chile, [5]Rehabilitation Center, Emory University, Atlanta, USA*

**Poster F21: Is Structural Connectivity of Basal Ganglia Associated with Learned Non-Use in Chronic Stroke?**
Motor Rehabilitation
Bokkyu Kim[1], Youngmin Oh[1,2], Richard Leahy[3,4], Justin Haldar[3,4], Nicolas Schweighofer[1,2], Carolee Winstein[1]
*[1]Division of Biokinesiology and Physical Therapy at University of Southern California, Los Angeles, CA, USA, [2]Neuroscience Graduate Program at University of Southern California, Los Angeles, CA, USA, [3]Ming Hsieh Department of Electrical Engineering at University of Southern California, Los Angeles, CA, USA, [4]Brain and Creativity Institute at University of Southern California, Los Angeles, CA, USA*

Full abstracts can be found at www.asnr.com

**Friday, October 16** **10:00 am – 12:00 pm** **Poster Session II**

**Poster F22: Toward a Self-Calibrating Brain-Computer Interface for People with Tetraplegia**
Motor Rehabilitation
Beata Jarosiewicz[1,2], Anish Sarma[1,2], John Simeral[2,1], Daniel Bacher[1], Jad Saab[1], Brittany Sorice[3], Christine Blabe[4], Sydney Cash[3,5], Emad Eskandar[3], Krishna Shenoy[4], Jaimie Henderson[4], Leigh Hochberg[2,1]
*[1]Brown University, Providence, RI, USA, [2]Dept. of VA Medical Center, Providence, RI, USA, [3]Massachusetts General Hospital, Boston, MA, USA, [4]Stanford University, Stanford, CA, USA, [5]Harvard Medical School, Boston, MA, USA*

**Poster F23: Imperceptible Random Vibration Applied to Wrist Skin Increased EEG Evoked Potential for Fingertip Touch**
Sensory Rehabilitation
Na Jin Seo[1], Kishor Lakshminarayanan[2], Brian Schmit[3]
*[1]Medical University of South Carolina, Charleston SC, USA, [2]University of Wisconsin-Milwaukee, Milwaukee WI, USA, [3]Marquette University, Milwaukee WI, USA*

**Poster F24: From Noise to Music: Using Bayesian Statistical Parameter Estimation to Model Intra-Individual MEP Variability Before and After TBS for More Dynamic Biomarkers of Plasticity.**
Stroke
Rachel Wurzman[1], Denise Harvey[1,3], Olufunsho Faseyitan[1,2], Daniela Sacchetti[1,2], Roy Hamilton[1,2]
*[1]Laboratory for Cognition and Neural Stimulation, University of Pennsylvania, Philadelphia, PA, USA, [2]Department of Neurology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA, [3]Moss Rehabilitation Research Institute, Elkins Park, PA, USA*

**Poster F25: Paired Brain and Spinal Cord Stimulation to Strengthen Corticospinal Responses**
Motor Rehabilitation
Asht Mishra[1], Disha Gupta[1], Ajay Pal[1], Jason Carmel[1,2]
*[1]Burke Medical Research Institute, White Plains, NY, USA, [2]Weill Cornell Medical College, New York, NY, USA*

**Poster F26: Impaired Multi-Finger Synergies in Individuals with Multiple Sclerosis**
MS
Daniela Mattos[1,3], Hang Jin Jo[1], Elisabeth Lucassen[1,2], Mark L. Latash[1]
*[1]Pennsylvania State University, State College, PA, USA, [2]Pennsylvania State University-Milton S. Hershey Medical Center, Hershey, PA, USA, [3]University of Delaware, Newark, DE, USA*

**Poster F27: Training a Complex Arm Skill Transfers to Improved Simple Reaching Tasks and Modulates Corticospinal Excitability in Patients With Stroke**
Motor Rehabilitation
Nazaneen Zahedi, Robert McGrath, Shailesh Kantak
*Moss Rehabilitation Research Institute, Elkins Park, PA, USA*

**Poster F28: Effects of Metformin and Enriched Rehabilitation on Recovery Following Neonatal Hypoxia-Ischemia**
Motor Rehabilitation
Sabina Antonescu[1,3], Matthew Jeffers[1,3], Jessica Livingston-Thomas[1,3], Cindi Morshead[2], Dale Corbett[1,3]
*[1]University of Ottawa, Ottawa, Canada, [2]University of Toronto, Toronto, Canada, [3]Canadian Partnership for Stroke Recovery, Ottawa, Canada*

**Poster F29: Effects of Limb Non-Use on Resting Functional Connectivity**
Motor Rehabilitation
Alex Carter, Kristi Zinn, Xin Hong
*Washington University School of Medicine, Saint Louis, MO, USA*

Full abstracts can be found at www.asnr.com

**Friday, October 16** **10:00 am – 12:00 pm** **Poster Session II**

**Poster F30: Short-Term Practice Effects Predict Longer-Term Upper Extremity Motor Learning in Older Adults With and Without Mild Cognitive Impairment**
Motor Rehabilitation
Sydney Schaefer[1,2], Jeffrey Nielsen[1], Tyson Lumbreras[1], Kevin Duff[2]
*[1]Utah State University, Logan, UT, USA, [2]University of Utah, Salt Lake City, UT, USA*

**Poster F31**: **Differential Effects of Moderate and High Intensity Exercise on Corticomotor Excitability, Intracortical Inhibition and Intracortical Facilitation**
Motor Rehabilitation
Miriam Rafferty[1,2], Samantha Keil[2], Daniel Corcos[1]
*[1]Northwestern University, Chicago, IL, USA, [2]University of Illinois at Chicago, Chicago, IL, USA*

**Poster F32: Reduced Ankle Muscle Co-Contraction after Robot-Guided Therapy in Children with Cerebral Palsy**
Motor Rehabilitation
Yi-Ning Wu[1], Yupeng Ren[2,3], Li-Qun Zhang[2,3]
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**Poster F33: Comparing Mirror Visual Feedback and Actual Visual Feedback Post Stroke**
Motor Rehabilitation
Qiang Lin[1,2], Viswanath Aluru[1], Daniel Geller[1], David Rhee[1], Sravani Mudumbi[5], Priya Bolikal[4], Eric Altschuler[4], Ying Lu[3], Preeti Raghavan[1]
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**Poster F34: Discriminating Visuospatial Neglect from Proprioceptive Impairment using Robotics**
Stroke
Janice E. Yajure[1,2], Jennifer A. Semrau[1,2], Troy M. Herter[4], Stephen H. Scott[3], Sean P. Dukelow[1,2]
*[1]University of Calgary, Calgary, AB, Canada, [2]Hotchkiss Brain Institute, Calgary, AB, Canada, [3]Queen's University, Kingston, ON, Canada, [4]University of South Carolina, Columbia, South Carolina, USA*

**Poster F35: Transcranial Direct Current Stimulation Lessens Dual Task Cost in People with Parkinson's Disease**
Cognitive/Language Rehabilitation
Chad Swank, Jyutika Mehta, Christina Criminger
*Texas Woman's University, Dallas, TX, USA*

**Poster F36: Characterizing Impairments in Digit Angular Excursion and Individuation in Different Shoulder Positions Post-Stroke**
Motor Rehabilitation
Alvin Tang[1], Viswanath Aluru[1], Mohamed Hassan[3], Lauri Bishop[2], Joel Stein[2], Preeti Raghavan[1]
*[1]New York University School of Medicine, New York, New York, USA, [2]Columbia University, New York, New York, USA, [3]New York University Physical Therapy, New York, New York, USA*

**Poster F37: Statin Medication Use and Nosocomial Infection Risk in the Acute Phase of Stroke**
Stroke
Douglas Weeks[1], Christopher Greer[1], Megan Willson[2]
*[1]St. Luke's Rehabilitation Institute, Spokane, WA, USA, [2]Providence Sacred Heart Medical Center, Spokane, WA, USA*

**Poster F38: Use of the GesAircraft Video Game for Upper Limb Rehabilitation in Stroke: A Pilot Study**
Stroke
David Putrino[1,2], Helma Zanders[1], Avrielle Rykman[1], Peter Lee[1], Luis Disla[3], Owais Naeem[3], Tanjin Panna[3], Dylan Edwards[1,2]
*[1]Burke Medical Research Institute, White Plains, NY, USA, [2]Cornell University, New York, NY, USA, [3]GesTherapy, Inc, Brooklyn, NY, USA*

**Poster F39: Reactive and Voluntary Stepping in Individuals With Stroke: A Comparison Between Paretic and Nonparetic Leg Responses**
Motor Rehabilitation
Chieh-ling Yang[1], Vicki Gray[1], Masahiro Fujimoto[2], Sandy McCombe Waller[1], Mark Rogers[1]
*[1]University of Maryland Baltimore, Baltimore, MD, USA, [2]Ritsumeikan University, Kusatsu, Japan*

**Poster F40: Towards Assessing Mobility in Parkinson's Disease Patients Using a Single 3D Sensor**
Motor Rehabilitation
Luciano Nocera[1], Helen R. Bacon[2], Jiun-Yu Kao[1], Yu-Chen Chung[2], Yi-An Chen[2], Lorraine Sposto[1], Beth E. Fisher[2], Cyrus Shahabi[1], Carolee J. Winstein[2]
*[1]Integrated Media Systems Center, University of Southern California, Los Angeles, CA, USA, [2]Division of Biokinesiology and Physical Therapy University of Southern California, Los Angeles, CA, USA*

**Poster F41: Rehabilitation-Based Motor Pattern Differences after Biological and Bionic Therapies in Spinal Cord Injury (SCI)**
Motor Rehabilitation
David Logan[1], John K. Lee[1,2], Qi Yang[1], Simon F. Giszter[1,2]
*[1]Neurobiology & Anatomy, Drexel University College of Medicine, Philadelphia,PA, USA, [2]Biomedical Engineering, Drexel University, Philadelphia, PA, USA*
**Support:** Provided by the Brody Family Medical Trust Fund Fellowship in "Incurable diseases" of The Philadelphia Foundation.

**Poster F42: Associations Between Foot Cutaneous Sensation and Muscle Activation Patterns During Unexpected Lateral Perturbations After Stroke**
Stroke
Vicki Gray, Chieh-ling Yang, Sandy McCombe Waller, Mark Rogers
*University of Maryland, Baltimore, USA*
**Support:** AHA 14CRP19880025; NIDRR H133F140027; NIDRR H133P100014

**Poster F43: Towards a Low-Cost Alternative for BCI-aided Neurorehabilitation: A Comparison of the Emotiv Epoc to a Clinical EEG System**
Motor Rehabilitation
Camilo Aguilar[1,2], Omar Shanta[1], Thuong Tran[1], David Reinkensmeyer[1], Sumner Norman[1]
*[1]University of California, Irvine, Irvine, California, USA, [2]Purdue University, West Lafayette, Indiana, USA*

**Friday, October 16** **10:00 am – 12:00 pm** **Poster Session II**

**Poster F44: Employing Patient's Individual Characteristics to Derive Personalized Brain Stimulation Therapies**
Stroke
Vishwanath Sankarasubramanian[1], Nicole Varnerin[1], David Cunningham[1], Kelsey Potter-Baker[1], Ken Sakaie[1], Adriana Conforto[2], Andre Machado[1], Ela Plow[1]
*[1]Cleveland Clinic, Cleveland/Ohio, USA, [2]Sao Paulo University, Sao Paulo, Brazil*

**Poster F45: Compensatory Stepping in People with Multiple Sclerosis**
MS
Daniel Peterson[1,2], Jessie Huisinga[3], Fay Horak[1,2]
*[1]Veterans Affairs Portland Health Care System, Portland, OR, USA, [2]Oregon Health & Science University, Portland, OR, USA, [3]University of Kansas Medical Center, Kansas City, KS, USA*

**Poster F46: Changes in Corticomuscular Coherence Associated with Different Levels of Isometric Hand Force Production Using MEG**
Motor Rehabilitation
Guiomar Niso[2], Sylvain Baillet[2], Elizabeth Bock[2], Patricia da Cunha Belchior[1], Marie-Hélène Boudrias[1]
*[1]School of Physical & Occupational Therapy, McGill University, Montreal, Quebec, Canada, [2]McConnell Brain Imaging Centre, Montreal Neurological Institute, Montreal, Quebec, Canada*

**Poster F47: Distribution of Corrective Movements Differ in People Post Stroke During Paretic Arm Reaching**
Motor Rehabilitation
Clinton Wutzke[1,3], Shashwati Geed[3], Evan Chan[2], Rachael Harrington[3,4], Michelle Harris-Love[3,5]
*[1]Veterans Affairs Medical Center, Washington, District of Columbia, USA, [2]MedStar Health Research Institute, Washington, District of Columbia, USA, [3]MedStar National Rehabilitation Hospital, Washington, District of Columbia, USA, [4]Georgetown University, Washington, District of Columbia, USA, [5]George Mason University, Fairfax, Virginia, USA*

**Poster F48: Clinical Characteristics Changes of Phantom Phenomen After Traumatic Limb Amputation**
Sensory Rehabilitation
Widjajalaksmi Kusumaningsih
*Department of Rehebilitation Medicine, Faculty Of Medicine, University Of Indonesia, Jakarta, Indonesia, Indonesia*

**Poster F49: Electrophysiological Mechanisms Underlying Visual Feedback in Prism Adaptation**
Neural Repair Mechanisms
S.J. MacLean[1], O.E. Krigolson[2], G.A. Eskes[1]
*[1]Dalhousie University, Halifax, Nova Scotia, Canada, [2]University of Victoria, Victoria, British Columbia, Canada*

**Poster F50: The Control of Grasp Force for Individuals Who Suffered a Stroke and Age-Matched Controls**
Stroke
Charlie E. Anderson, Rajiv George, Vicky Pardo, Kumar Rajamani, Diane E. Adamo
*Wayne State University, Detroit, MI, USA*
**Support:** for this study from Blue Cross Blue Shield of Michigan Foundation **Poster F51: Validation of Reaching Movements Made in a 2D Virtual Environment in Typically Developing Children**
Motor Rehabilitation
Maxime Robert[1,2], Krithika Sambasivan[2], Mindy F. Levin[1]
*[1]Integrated Program in Neuroscience, McGill University, Montreal, Quebec, Canada, [2]Center for interdisciplinary research in rehabilitation of greater montreal, Montreal, Quebec, Canada, [3]School of Physical and Occupational Therapy, McGill University, Montreal, Quebec, Canada*

**Friday, October 16** **10:00 am – 12:00 pm** **Poster Session II**

**Poster F52: Alterations in Cortical Laterality Among Individuals at Risk for Stroke: A Functional MRI Study in Controls and Patients**
Stroke
Daniel Lench, Christopher Austelle, Colleen Hanlon
*Medical University of South Carolina, Charleston, USA*

**Poster F53: Avoidance Strategies in Response to Animate and Inanimate Obstacles in Young Healthy Individuals Walking in a Virtual Reality Environment**
Motor Rehabilitation
Wagner Souza Silva[1,2], Gayatri Aravind[1], Samir Sangani[3], Anouk Lamontagne[1,2]
*[1]McGill University, School of Physical and Occupational Therapy, Montreal, Quebec/QC, Canada, [2]McGill University, Integrated Program in Neuroscience, Montreal, Quebec/QC, Canada, [3]Feil and Oberfeld Research Center, Jewish Rehabilitation Hospital, Laval, Quebec/QC, Canada*

**Poster F54: Muscle Fatigability and Subsequent Torque Decline During Isometric and Isokinetic Knee-Extension Generated by Sequential Electrical Stimulation**
Motor Rehabilitation
Austin Bergquist[1], Vishvek Babbar[1,2], Saima Ali[2], Milos Popovic[1,2], Kei Masani[1,2]
*[1]Toronto Rehabilitation Institute, University Health Network, Toronto, Ontario, Canada, [2]Institute of Biomaterials and Biomedical Engineering, University of Toronto, Toronto, Ontario, Canada*

**Poster F55: Subcortical Influences on Paired-pulse TMS-induced I-waves in Humans**
SCI
John Cirillo[1,2], Monica Perez[2,3]
*[1]University of Auckland, Auckland, New Zealand, [2]University of Pittsburgh, Pittsburgh, PA, USA, [3]University of Miami, Miami, FL, USA*

**Poster F56: Memantine Treatment for Post-stroke Aphasia: A Case Control Study**
Cognitive/Language Rehabilitation
Jennie Valles, Juliana Kennedy, Mery Elashvili, Carolin Dohle
*Burke Rehabilitation Hospital, White Plains, NY, USA*

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**ASNR Mentoring Breakfast**
(pre-registration was required for this event)

**Axonal Sprouting and Growth after Neural Injury**
*Organized by S. Thomas Carmichael, MD, PhD*

**Novel Applications of FDA Approved Drugs in Neurologic Rehabilitation**
*Organized by William Zev Rymer, MD, PhD & Rajiv Ratan, MD, PhD*

**ASNR Foundation Award Dinner**
This year we honor Ross Mason, MBA for his innovative work in developing medical care for those often neglected in our health systems: the indigent, disabled, wounded veterans and others. He has applied novel fundraising approaches, such as Venture Philanthropy, in work that has received widespread recognition. This event promises camaraderie with neurorehabilitation colleagues and exposure to new avenues for clinical care and even research funding.

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*Please see next page for the list of Annual Meeting Exhibitors*

# Toledo Ballroom Exhibitors

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Florida Institute for Neurologic Rehabilitation (FINR) has a specialized approach to neurologic rehabilitation. The Skilled Medical Rehabilitation Center at Florida Institute for Neurologic Rehabilitation has the expertise to assist you with the evaluation and treatment of catastrophic cases. Inpatient services include: ventilator weaning, coma stimulation, tracheostomy management, and wound care.

**Booth #2:**
MindMaze is a Swiss neurotechnology company committed to enhancing the quality of life of individuals who have suffered brain and spinal cord injuries. We aim to revolutionize the rehabilitation process by combining advanced brain monitoring technology with interactive 3D environments to develop the next generation of medical devices.

**Booth #3:**
DP Clinical (DPC) is a Contract Research Organization (CRO) located in Rockville, MD; providing monitoring, data management, data analysis and auditing services to pharmaceutical, biotechnology and medical device companies. Since 1994, DPC has worked on almost all acute and chronic SCI studies since the benchmark study of Sygen along with Autologous Macrophages and Stem Cells. Our staff is knowledgeable and experienced in managing SCI clinical trials. Over the years, DPC has built a strong reputation for high standards of quality, data integrity, cost-effectiveness and client satisfaction.

**Booth #4:**
Top-ranked by U.S. News for 23 years, Kessler Institute is one of only eight NIDRR-designated Model Systems for the treatment and research of traumatic brain and spinal cord injuries, and delivers that same leading-edge rehabilitative care for individuals with stroke, neurological diseases, cancer and other complex medical conditions.

**Booth #5:**
ANT Neuro offers products tailored to the needs of rehabilitation scientists including the eego line of EEG products which were developed from the ground up to allow collection of high density EEG and EMG data during movement without compromising data quality. ANT's visor2 TMS navigation system includes tools to enable fast and easy motor mapping.

**Booth #6:**
The World Federation for NeuroRehabilitation (WFNR) www.wfnr.co.uk is a multidisciplinary organisation. Its purpose is to advance the development of neurological rehabilitation worldwide. WFNR supports and sponsors regional meetings and a World Congress is held every 2 years. The next will be held in Philadelphia, USA from 10-13 May 2016 www.wcnr2016.org



*Please see page 23 for exhibit booth diagram*

**Booth #7:**
A leading robotic exoskeleton company, Ekso Bionics'(TM) Ekso GT(TM) robotic exoskeleton is designed to enable individuals with weakness or paralysis of the lower limbs, due to spinal cord injury (SCI), stroke, and other conditions causing lower extremity weakness, to perform ambulatory functions.

**Booth #8:**
g.tec shows brain-computer interface (BCI) technology that can be used for the assessment of cognitive functions (mindBEAGLE) and for stroke rehabilitation (recoveriX). We mainly produce devices for measurements of brainsignals.(EEG)

**Booth #11:**
Mallinckrodt is a global specialty biopharmaceutical and medical imaging business that develops, manufactures, markets and distributes specialty pharmaceutical products and medical imaging agents. Mallinckrodt sees an opportunity in intrathecal medicines for a wide range of conditions including spasticity, pain and other central nervous system disorders. Visit www.mallinckrodt.com to learn more.

**Booth #12:**
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*Please see page 23 for exhibit booth diagram*

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Speaker: Mindy Aisen, MD
Commercial Interest: None

Speaker: Larry Benowitz, PhD
Commercial Interest: None

Speaker: Lara Boyd, PT, PhD
Commercial Interest: University of South Dakota
Role: Speaking

Panelist: David Brown, MD
Commercial Interest: HDT Robotics
Role: Inventor and Consultant

Speaker: Laurel Buxbaum, PsyD
Commercial Interest: None

Speaker: Winston Byblow, PhD
Commercial Interest: None

Speaker: Jose Carmena, PhD
Commercial Interest: None

Speaker: Jason Carmel, MD, PhD
Commercial Interest: None

Speaker: S. Thomas Carmichael, MD, PhD
Commercial Interest: Biotime Inc.
Role: Principal Investigator

Panelist: Steven Cramer, MD
Commercial Interest: Roche, MicroTransponder, Dart Neuroscience & RAND Corp
Role: Consultant

Speaker: Sunghee Cho, PhD
Commercial Interest: None

Speaker: Maurizio Corbetta, MD
Commercial Interest: None

Speaker: Leonardo Cohen, MD
Commercial Interest: None

Speaker: Jörn Diedrichsen, PhD
Commercial Interest: None

Speaker: Monica Gorassini, PhD
Commercial Interest: None

Speaker & Panelist: Thomas George Hornby, PhD, PT
Commercial Interest: None

Organizer: John Krakauer, MD, PhD
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Moderator: Catherine Lang, PhD, PT
Commercial Interests: AOTA Press & Neurolutions
Roles: Book Authorship & Advice Product Development

Panelist: Albert Lo, MD, PhD
Commercial Interest: Eli Lilly and Company
Role: Employment

Speaker: Jesper Lundbye-Jensen, MSc, PhD
Commercial Interest: None

Speaker: Cameron Mang, MSc
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Speaker: Bence Ölveczky, PhD
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Moderator: William Zev Rymer, MD, PhD
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Speaker: Shelly Sakiyama-Elbert, PhD
Commercial Interest: Kuros Therapeutics
Role: Invetor

Speaker: Milap Sandhu, PT, PhD
Commercial Interest: None

Organizer: Maurice Smith, MD, PhD
Commercial Interest: None

Speaker: Keith Tansey, MD, PhD
Commercial Interest: Neuralstem & Cornerstone Engineering
Role: Advisory Committee & Consulting

Speaker: Carolee Winstein, PhD, PT, FAPTA
Commercial Interest: St. Jude's Medical Business Services
Role: Consultant

Speaker: George Wittenberg, MD, PhD, FASNR
Commercial Interest: None

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In 1990, the ASNR was founded by neurorehabilitation specialists from different fields who recognized the need to be united in one organization with the single purpose of fostering excellence in neurorehabilitation research and practice. Over the years, the society has continued to foster dialogue between disciplines at our annual meetings, our regional symposia and through our internationally recognized journal, *Neurorehabilitation and Neural Repair*. ASNR subcommittees focus on promotion of common research and development interests, patient advocacy, and fundraising for further growth and support of the organization.

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The journal carries articles designed to appeal to a variety of audiences: clinical practice, research, brief communications, case reports, reviews, and media reviews.

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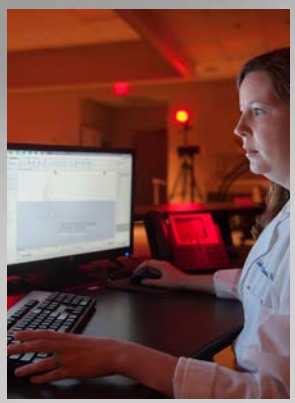

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