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
Groundbreaking Treatment for TBI

By Christine Lefaivre

“Chris Lefaivre’s portrayal of working with her clients, their families, and the treatment team is inspirational. … This well written and accessible book is truly a must-read for all health and social workers, legal professionals, family members, employers and indeed anyone involved in the support of traumatically brain injured individuals.”

—Deborah Buszard, PhD, Deputy Vice Chancellor, University of British Columbia

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Every Neurological Patient Is Unique. Your Rehabilitation Should Be Too.

BURKE REHABILITATION HOSPITAL offers custom-designed programs based on your individual needs. If you have experienced a life changing event such as a stroke, brain injury, spinal cord injury or a neurological condition and can benefit from acute inpatient rehabilitation, Burke is here to help you reach your maximum recovery.

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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

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
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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.
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<thead>
<tr>
<th>TIME</th>
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<tbody>
<tr>
<td>7:00 am – 8:00 am</td>
<td>EXHIBITS &amp; REGISTRATION</td>
<td>Toledo Ballroom &amp; Upper 5th</td>
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<td>8:00 am – 8:30 am</td>
<td>Introduction and Presidential Oration</td>
<td>Renaissance</td>
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<td>Explaining Neurorehabilitation: What do we tell ourselves and our patients?</td>
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<td>George Wittenberg, MD, PhD, FASNR</td>
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<tr>
<td>8:30 am – 10:00 am</td>
<td>Symposium #1: The Uninjured Hemisphere in Hemiplegia: Friend or Foe?</td>
<td>Renaissance</td>
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<td>Organized by Jason Carmel, MD, PhD</td>
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<td>This symposium will be structured in a debate format.</td>
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<td>Foes’ Perspective:</td>
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<td>The Uninjured Hemisphere in Hemiplegia: Friend for some and Foe for others</td>
<td>Lara Boyd, PT, PhD</td>
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<td>Contributions of the healthy and lesioned hemisphere to recovery of motor function</td>
<td>Leonardo Cohen, MD</td>
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<td>Friends’ Perspective:</td>
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<td></td>
<td>Is the contralesional hemisphere a suitable target for noninvasive brain stimulation after stroke?</td>
<td>Winston Byblow, PhD</td>
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<td>The Uninjured Hemisphere in Hemiplegia: Friend or Foe?</td>
<td>Jason Carmel, MD, PhD</td>
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<td>8:30 am – 8:35 am</td>
<td>Intro of speakers and format</td>
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<td>8:35 am – 9:00 am</td>
<td>Perspective One presents argument</td>
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<td>9:00 am – 9:25 am</td>
<td>Perspective Two presents argument</td>
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<td>9:25 am – 9:35 am</td>
<td>Rebuttal from Perspective One</td>
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<td>9:35 am – 9:45 am</td>
<td>Rebuttal from Perspective Two</td>
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<tr>
<td>9:45 am – 10:00 am</td>
<td>Discussion and conclusion</td>
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<td>10:00 am – 12:00 pm</td>
<td>Poster Session I &amp; Exhibits</td>
<td>Toledo Ballroom &amp; Upper 5th</td>
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| 12:00 pm – 12:30 pm| Outstanding Neurorehabilitation Clinician-Scientist Award Presentation and Lecture  
A common physiological phenotype of abnormal network connectivity predicts multiple behavioral impairments in stroke  
*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:  
Aerobic Exercise Effects on Neuroplasticity: From Neurobiology to Behavior  
Organized by Cameron S. Mang, MSc | Renaissance |
| 1:30 pm – 2:00 pm | Effects of exercise on human cognitive functions, motor learning and memory  
Jesper Lundbye-Jensen, MSc, PhD |          |
| 2:00 pm – 2:30 pm | Acute effects of high-intensity aerobic exercise on neuroplasticity and motor learning  
Cameron Mang, MSc |          |
| 2:30 pm – 3:00 pm | Aerobic exercise effects on neuroplasticity - from animal models to clinical trials  
Michelle Ploughman, PT, PhD |          |
| 3:00 pm – 3:30 pm | Viste Award Presentation and Lecture:  
Neurological Rehabilitation in the late 20th and early 21st Centuries:  
Where we are, where we have been, and where we are going  
*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**

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<th>TIME</th>
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<tbody>
<tr>
<td>3:45 pm – 5:15 pm</td>
<td>Symposium #3: Axonal Sprouting and Growth after Neural Injury</td>
<td>Renaissance</td>
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<td>ASNR Foundation thanks the Craig H. Neilsen Foundation for their generous support of this symposium</td>
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<td>Organized by S. Thomas Carmichael, MD, PhD</td>
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<tr>
<td>3:45 pm – 3:50 pm</td>
<td>Introduction</td>
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<td>3:50 pm – 4:10 pm</td>
<td>Rewiring injured neural pathways</td>
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<td>4:10 pm – 4:30 pm</td>
<td>Nociceptive Afferent Sprouting, Hypereflexia and Dysautonomia in Spinal Cord Injury</td>
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<td>4:30 pm – 4:50 pm</td>
<td>Molecules that Enhance Axonal Sprouting and Recovery after Stroke</td>
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<td>4:50 pm – 5:10 pm</td>
<td>Temporally Regulated GDNF Delivery Prevent Axon Trapping in Long Peripheral Nerve Injuries</td>
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<td>5:10 pm – 5:15 pm</td>
<td>Closing Discussion</td>
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<td>5:15 pm – 7:00 pm</td>
<td>BREAK &amp; EXHIBITS</td>
<td>Toledo Ballroom &amp; Upper 5th</td>
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<tr>
<td>7:00 pm – 9:00 pm</td>
<td>ASNR Education Foundation Dinner &amp; Kessler Foundation Award Lecture:</td>
<td>King Arthur’s Court</td>
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<td>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</td>
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**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:

<table>
<thead>
<tr>
<th>Diane Adamo, OTR, MS, PhD</th>
<th>Gail Eskes, PhD</th>
<th>W. Zev Rymer, MD, PhD</th>
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<tr>
<td>Jason Carmel, MD, PhD</td>
<td>Scott Frey, PhD</td>
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<td>Tom Carmichael, MD, PhD</td>
<td>David Good, MD</td>
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<td>Catherine Lang, PT, PhD</td>
<td>Steve Wolf, PhD, PT</td>
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<td>Bruce Dobkin, MD</td>
<td>Mindy Levin, PT, PhD</td>
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<td>7:00 am – 8:00 am</td>
<td><strong>ASNR Mentoring Breakfast</strong></td>
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<td>for their generous support of this Breakfast</td>
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<td>8:00 am – 10:00 am</td>
<td><strong>Symposium #4:</strong></td>
<td>Renaissance</td>
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<td><strong>ASNR/TCMC Joint Session:</strong></td>
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<td><strong>Applied patient-based motor symposium</strong></td>
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<td>Featured Speakers and Trainee Presentations</td>
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<td>Organized by John Krakauer, MD &amp;</td>
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<td>Maurice Smith, MD, PhD</td>
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<td><strong>Featured Speakers:</strong></td>
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<td></td>
<td>What parietal apraxia reveals</td>
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<td>about the brain's two action systems</td>
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<td>Laurel Buxbaum, PsyD</td>
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<td><strong>Motor cortex as a ‘tutor’ for the striatum</strong></td>
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<td>during motor skill learning</td>
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<td>Bence Ölveczky, PhD</td>
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<td>10:00 am – 12:00 pm</td>
<td><strong>Poster Session II &amp; Exhibits</strong></td>
<td>Toledo Ballroom &amp; Upper 5th</td>
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<td>11:00 am – 12:00 pm</td>
<td><strong>TCMC REGISTRATION</strong></td>
<td>Elevator Lobby</td>
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<td>12:00 pm – 7:00 pm</td>
<td><strong>TCMC Session</strong></td>
<td>Renaissance</td>
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<td><strong>Featured Speakers:</strong></td>
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<td>Large-Scale Neural Circuit Dynamics During Neuroprosthetic</td>
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<td>Skill Learning</td>
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<td>Jose Carmena, PhD</td>
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<td><strong>The cortical hierarchy of motor representations:</strong></td>
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<td>Decoding the building blocks of motor skill</td>
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<td>Jörn Diedrichsen, PhD</td>
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<td>12:00 pm – 1:30 pm</td>
<td><strong>LUNCH</strong> (on your own)</td>
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| 1:30 pm – 2:30 pm | **ASNR Oral Abstracts**  
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**  
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**  
Nathaniel Makowski, PhD |                  |
| 1:54 pm – 2:06 pm | **Changes in Synaptic Function and Excitability in Single Neurons Following Transcranial Magnetic Stimulation**  
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**  
Kelsey Potter-Baker, PhD |                  |
| 2:18 pm – 2:30 pm | **Detection and Predictive Value of Fractional Anisotropy Abnormalities in the Acute Stroke Patients**  
Gottfried Schlaug, PhD |                  |
| 2:30 pm – 4:00 pm | **Symposium #5: Novel Applications of FDA Approved Drugs in Neurologic Rehabilitation**  
**ASNR Foundation thanks the Craig H. Neilson Foundation for their generous support of this symposium**  
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**  
Rajiv Ratan, MD, PhD |                  |
| 3:05 pm – 3:15 pm | **Clinically approved daidzein enhances cholesterol homeostasis via ApoE to promote stroke recovery in mice**  
Sunghee Cho, PhD |                  |
| 3:15 pm – 3:25 pm | **Drugs for Motor Rehabilitation – a fine balancing act**  
Monica Gorassini, PhD |                  |
| 3:25 pm – 3:35 pm | **Combined pharmacological and physical interventions following neurological injury**  
T. George Hornby, PhD, PT |                  |
| 3:35 pm – 3:45 pm | **Inflammatory suppression augments intermittent hypoxia-induced plasticity in individuals with spinal cord injury**  
Milap Sandhu, PT, PhD |                  |
| 3:45 pm – 4:00 pm | **Discussion and wrap-up** |                  |
### Program at a Glance - Friday

**Friday, October 16**

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<tr>
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<tr>
<td>4:00 pm – 4:30 pm</td>
<td><strong>BREAK</strong></td>
<td>Toledo Foyer</td>
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| 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>
*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

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**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.

George Wittenberg, MD, PhD, FASNR

*University of Maryland*
Foes’ Perceptive:

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.
Friends’ Perceptive:

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.
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.

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

**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.

Cameron Mang, MSc  
University of Alberta

**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

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

**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.

Mindy Aisen, MD  
Rancho Los Amigos National Rehabilitation Center
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
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.

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

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.

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

Shelly Sakiyama-Elbert,
PhD
Washington University in Saint Louis
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 Satthian, MD, PhD, FAAN
7:15 pm ASNR Award Winners and Fellows Recognized
7:30 pm Kessler Award Lecture: Ross Mason, MBA
Friday, October 16  
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

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.

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

<table>
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<th>Time</th>
<th>TCMC Session</th>
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| 12:00 pm – 7:00 pm | Featured Speakers and Trainee Presentations  
Organized by John Krakauer, MD & Maurice Smith, MD, PhD |

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*

**Maurice Smith, MD, PhD**  
*Harvard University*

**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.

**John Krakauer, MD**  
*John Hopkins University*

**Maurice Smith, MD, PhD**

**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*
Presenting Authors:

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

Jessica Livingston-Thomas¹², Matthew Jeffers¹², Carine Nguemeni¹², Molly Shoichet³, Cindi Morshead³, Dale Corbett¹²

¹University of Ottawa, Ottawa, ON, Canada, ²Canadian Partnership for Stroke Recovery, Ottawa, ON, Canada, ³University of Toronto, Toronto, ON, Canada

**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

**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

**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

**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
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.
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.

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.
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.

Milap Sandhu, PT, PhD
Rehabilitation Institute of Chicago

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.

ASNR Clinical Research Network

ASNR Foundation thanks the Craig H. Nielsen Foundation for their generous support of this Symposium
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.
Poster Sessions & Exhibit Diagrams

Toledo Ballroom, Lower Level

Upper 5th, Balcony

Please see pages 41-42 for Exhibitor List
Abstracts - Thursday

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 Hayward¹,², Janice J Eng¹,³, Lara A Boyd¹, Bimal Lakhani¹, Julie Bernhardt²,⁴, Catherine Lang⁵
¹University of British Columbia, Vancouver, Canada, ²University of Melbourne, Melbourne, Australia, ³Vancouver Coastal Health Research Institute, Vancouver, Canada, ⁴Latrobe University, Melbourne, Australia, ⁵Washington University, St Louis, USA

Poster T3: Effect of task-specific training on Eph/ephrin expression after stroke
Neural Repair Mechanisms
Dong-Hee Choi¹,², Jin-Hee Ahn¹, In-Ae Choi¹, Ji-Hye Kim¹, Jongmin Lee¹,³
¹Center for Neuroscience Research, Institute of Biomedical Science and Technology, Konkuk University, Seoul, Republic of Korea, ²Department of Medical Science, School of Medicine, Konkuk University, Seoul, Republic of Korea, ³Department 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 Guger¹,², Rupert Ortner², Danut Irimia²
¹g.tec medical engineering GmbH, Schiedberg, Austria, ²Guger Technologies OG, Graz, Austria, ³g.tec neurotechnology USA Inc., Albany, USA

Poster T5: Awareness Assessment and Communication Tool for Patients with Disorders of Consciousness
Disorders of Consciousness
Christoph Guger¹,², Rupert Ortner²
¹g.tec medical engineering GmbH, Schiedberg, Austria, ²Guger Technologies OG, Graz, Austria, ³g.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 Paulten, Lorie Richards
University of Utah, Salt Lake City, USA

Poster T8: Targeted Memory Reactivation to Improve Motor Learning
Motor Rehabilitation
Brian Johnson¹, Steven Scharf²,³, Kelly Westlake¹
¹University of Maryland School of Medicine, Department of Physical Therapy & Rehabilitation Science, Baltimore, Maryland, USA, ²University of Maryland Sleep Disorders Center, Baltimore, Maryland, USA, ³University of Maryland Medical Center, Division of Pulmonary and Critical Care Medicine, Baltimore, Maryland, USA

Full abstracts can be found at www.asnr.com
Abstracts - Thursday

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 Lohse1, Lara Boyd2, Catherine Lang3
1Auburn University, Auburn, Alabama, USA, 2University of British Columbia, Vancouver, British Columbia, Canada, 3Washington University School of Medicine, St. Louis, Missouri, USA

Poster T10: Exercise, Cognition and Brain Imaging in Parkinsonism - Study Design
Motor Rehabilitation
Katrijn Smulders1, Laurie King1, Martina Mancini1, Daniel Peterson1,2, Patricia Carlson-Kuhtas1, John Nutt1, Brett Fling1, Fay Horak1,2
1Oregon Health & Science University, Portland, OR, USA, 2VA Portland Health Care Systems, Portland, OR, USA

Poster T11: Freezing of Gait in Parkinson’s Disease: A Stopping Deficit?
Motor Rehabilitation
Katrijn Smulders1, Daniel Peterson1,2, John Nutt1, Fay Horak1,2, Brett Fling1
1Oregon Health & Science University, Portland, OR, USA, 2VA Portland Health Care Systems, Portland, OR, USA

Stroke
Won-Seok Kim1, Sungmin Cho2, Hyunwoo Bang2, Nam-Jong Paik1
1Department of Rehabilitation Medicine, Seoul National University Bundang Hospital, Seongnam-si, Gyeonggi-do, Republic of Korea, 2School of Mechanical and Aerospace Engineering, Seoul National University, Seoul, Republic of Korea

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Poster T13: Hebbian-Type Motor Cortex Stimulation Promotes Motor Learning in Chronic Stroke Patients
Stroke
Julianne Freeman1, Gregory Kowalski1, Kate Revill1, Marc Haut2, Samir Belagaje1, Gerald Hobbs2, Cathrin Buetefisch1
1Emory University, Atlanta, GA, USA, 2West 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 Hayward1,2, Sue Peters1, Jason L Neva1, Katie P Wadden1, Lara A Boyd1
1University of British Columbia, Vancouver, Canada, 2University of Melbourne, Melbourne, Australia

Poster T15: Refinement of the PREP Algorithm for Predicting Recovery of Upper Limb Function After Stroke
Stroke
Cathy Stinear1, Suzanne Ackerley1, Winston Byblow1, Alan Barber1,2, Anna McRae2, Henrietta Lee1
1University of Auckland, Auckland, New Zealand, 2Auckland District Health Board, Auckland, New Zealand

Full abstracts can be found at www.asnr.com
Abstracts - Thursday

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

Stoke
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

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 Karrthikeyan1, Matthew Jeffers1, Anthony Carter1, 2, Dale Corbett1, 2
1University of Ottawa, Ottawa, Canada, 2Canadian Partnership for Stroke Recovery, Ottawa, Canada

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

Stroke
Cheryl Carrico1, Kenneth C. Chelette1, Elizabeth Salmon-Powell1, Laurie Nichols1, Emily Salyers1, Lumy Sawaki1
1University of Kentucky, Lexington, KY, USA, 2Cardinal Hill Hospital, Lexington, KY, USA

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

Neural Repair Mechanisms
Hiroaki Fujimoto1, Masahito Mihara2, Noriaki Hattori1, Megumi Hatakenaka1, Hajime Yagura1, Teiji Kawano1, Hideki Mochizuki2, Ichiro Miyai1
1Morinomiya Hospital, Osaka, Japan, 2Osaka 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 Ikuno1, 2, Tomofumi Yamaguchi3, Ken Fuchigami2, 4, Soichiro Koyama3, Hiroyuki Kobayashi6, Masaki Kitaura9, Saori Kawaguchi3, Kanako Fujikawa9, Hikaru Matsunaga10
1Nishiyamato Rehabilitation Hospital, Kammakicho, Nara, Japan, 2Kio University, Koryo-cho, Nara, Japan, 3Keio University School of Medicine, Shinjuku-ku, Tokyo, Japan, 4Kishiwada Eishinkai Hospital, Kishiwada-shi, Osaka, Japan, 5Kawamura Hospital, Gifu-shi, Gifu, Japan, 6Sumiya Rehabilitation Hospital, Wakayama-shi, Wakayama, Japan, 7Wakayama Physical Therapy College, Wakayama-shi, Wakayama, Japan, 8Terashiba Hospital, Wakayama-shi, Wakayama, Japan, 9Kyowakai Hospital, Suita-shi, Osaka, Japan, 10Tokyo 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
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 Harrington1,2, Evan Chan3, Sambit Mohapatra1,2, Clinton J. Wutzke2,5, Amanda K. Rounds2,4, Dijo Abraham2, Michelle L. Harris-Love1,2  
1Georgetown University, Washington, DC, USA, 2Medstar National Rehabilitation Hospital, Washington, DC, USA, 3Medstar Health Research Institute, Washington, DC, USA, 4George Mason University, Fairfax, VA, USA, 5Veterans 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*

Motor Rehabilitation  
Mohammed Ata1  
1Faculty of physical therapy - Cairo University, Cairo, Egypt

Poster T28: Impact of Motor Practice on Neuromodulation for Stroke Rehabilitation  
Motor Rehabilitation  
Caylen White1,2, Damian Funke1,2, Crystal Massie1,2  
1Indiana University, Indianapolis, IN, USA, 2Indiana Center for Advanced Neurorehabilitation, Indianapolis, IN, USA

Stroke  
David Cunningham1,2, Jayme Knutson1, Kelsey Potter-Baker1, Vishwanath Sankarasubramanian1, Nicole Varnerin1, Corin Bonnett1, Thelma Asare1, Andre Machado1, Ela Plow1  
1Cleveland Clinic, Cleveland, Ohio, USA, 2Kent State University, Kent, 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 Pundik1,2, Jessica McCabe2, Margaret Skelly2, Curtis Tatsuoka1, Janis Daly3,4  
1Case Western Reserve University, Cleveland, OH, USA, 2Cleveland VA Medical Center, Cleveland, OH, USA, 3McKnight Brain Institute, University of Florida, Gainesville, FL, USA, 4Brain Rehabilitation Research Center of Excellence V A Medical Center, Gainesville, FL, USA

Full abstracts can be found at [www.asnr.com](http://www.asnr.com)
Poster T32: Contralaterally Controlled Functional Electrical Stimulation and Hand Therapy Video Games for Cerebral Palsy
Motor Rehabilitation
Michael Fu¹ ², Anna Curby³, Ryan Suder³, John Chae² ⁴, Jayme Knutson² ⁴
¹Case Western Reserve University, Cleveland, OH, USA, ²Cleveland FES Center of Excellence, Cleveland, OH, USA, ³Cleveland Clinic Children’s Hospital for Rehabilitation, Cleveland, OH, USA, ⁴MetroHealth 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 Zeeboer¹, Geetanjali Gera Dutta¹, Heather Schlueter¹, Fay B. Horak¹ ², Brett W. Fling¹
¹Oregon Health & Science University, Portland, Oregon, USA, ²VA Portland Healthcare System, Portland, Oregon, USA

Poster T34: Activation Training Alters Corticomotor Excitability of the Gluteus Maximus
Motor Rehabilitation
Yi-Ling Kuo¹, Christopher Powers¹, Anna Southam¹, Ya-Yun Lee¹ ², Beth Fisher¹
¹University of Southern California, Division of Biokinesiology and Physical Therapy, Los Angeles, USA, ²Healthy 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 McNulty¹ ², Angelica Thompson-Butel¹ ², Terry Trinh¹ ², Steven Faux² ³, Gaven Lin¹, Christine Shiner¹ ²
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Poster T37: Optimal Timing for Combined Neuromodulation Techniques to Enhance Motor Training in Chronic Stroke with Severe Motor Deficit
Motor Rehabilitation
Elizabeth Powell¹, Cheryl Carrico¹, Kenneth Chelette¹, Laurie Nichols¹ ², Emily Salyers¹, Lakshmi Reddy³, Lumy Sawaki¹ ²
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Poster T38: Biomarkers of Stroke Recovery Study (BIOREC) Methodology
Neural Repair Mechanisms
Matthew Edwardson¹ ², Shashwati Geed², Amrita Cheema¹, Ming Tan¹, Barbara Bregman¹ ², Alexander Dromerick² ¹
¹Georgetown University, Washington, DC, U.S.A, ²National Rehabilitation Hospital, Washington, DC, U.S.A
Support: Grant 1U10NS086513-01.

Full abstracts can be found at www.asnr.com
Abstracts - Thursday

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 Dimyan1,4, Elsa Ermer1,4, George Wittenberg1,4
1University of Maryland School of Medicine, Baltimore, MD, USA, 2University of Maryland Rehabilitation & Orthopedic Institute, Baltimore, MD, USA, 3University of Maryland Pepper Center, Baltimore, MD, USA, 4VA 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 Sambasivan1,2, Katherine Haentjens1, Sajida Khanafer1, Sandeep K Subramanian2,3, Melanie C Banina2, Anatol G Feldman3, Heidi Sveistrup4,5, Mindy F Levin1,2
1School of Physical and Occupational Therapy, McGill University, Montreal, QC, Canada, 2Jewish Rehabilitation Hospital, Centre for Interdisciplinary Research in Rehabilitation in Greater Montreal Area (CRIR), Laval, QC, Canada, 3Bachelor of Neuroscience, McGill University, Montreal, QC, Canada, 4Department of Neuroscience, University of Montreal, Montreal, QC, Canada, 5School of Rehabilitation Sciences, University of Ottawa, 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 Rodrigues1,2, Matthew Slimovitch2,4, Andreenne K Blanchette2,3, Mindy F Levin1,2
1School of Physical and Occupational Therapy, McGill University, Montreal, QC, Canada, 2Feil and Oberfeld Research Center, Jewish Rehabilitation Hospital, Center for Interdisciplinary Research in Rehabilitation of the Greater Montreal (CRIR), Laval, QC, Canada, 3Department of Rehabilitation, Laval University, Quebec, QC, Canada, 4Faculty of Medicine, McGill University, Montreal, QC, Canada

Poster T43: Motor Equivalence During Whole Body Reaching In Healthy Young Adults
Motor Rehabilitation
Yosuke Tomita1,2, Anatol Feldman2,3, Mindy Levin1,2
1McGill University, School of Physical and Occupational Therapy, Montréal, Canada, 2Center for Interdisciplinary Research in Rehabilitation (CRIR)-Jewish Rehabilitation Hospital, Laval, Canada, 3Université de Montréal, Département de neurosciences, Montréal, Canada

Poster T44: Effects of Positioning Exercise On Locomotor Function After Contusive Spinal Cord Injury in Rats
Motor Rehabilitation
Eseul Song1,3, Hochung Jeon1,3, Sunk-Chan Hahm1,3, Youngkyung Kim2, Young Wook Yoon2, Junesun Kim1,3
1College of health science, Korea University, Seoul, Republic of Korea, 2College of Medicine, Korea University, Seoul, Republic of Korea, 3Department 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).

Full abstracts can be found at www.asnr.com
Poster T45: Effects of Transcutaneous Electrical Nerve Stimulation (TENS) on Hand Dexterity in Chronic Acquired Brain Injury
Motor Rehabilitation
Adelyn Tsu1,2, Jason Godlove1,2, Gary Abrams1,2, Karunesh Ganguly1,2
1San Francisco VA Medical Center, San Francisco, CA, USA, 2University of California San Francisco, San Francisco, CA, USA

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 Liao1, Jill Whitall1,2, Joseph Barton1,3, Sandy McCombe-Waller1
1Department of Physical Therapy and Rehabilitation Science, School of Medicine, University of Maryland, Baltimore, MD, USA, 2Faculty of Health Sciences, Southampton, UK, 3Department 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 Subramanian1,6, Laetitia Rodrigues2,6, Louis Ryckembuschi,6, Tara Brohman3,6, Dorothy Barthelemy4,6, Mindy Levin5,6, Anatol Feldman1,6
1Neurosciences, Univ. De Montréal, Montreal, Quebec, Canada, 2Biomed. Engin., Univ. Paris Descartes, Paris, France, 3Inst. de génie biomédical, Univ. de Montréal, Montreal, Quebec, Canada, 4École de réadaptation, Univ. De Montréal, Montreal, Quebec, Canada, 5Sch. of Physical and Occup. Therapy, McGill University, Montreal, Quebec, Canada, 6Ctr. for Interdisciplinary Res. in Rehabil. of Greater Montreal (CRIR), Montreal, Quebec, Canada

Poster T52: Quantifying Post-Stroke Apathy with Actimeters
Cognitive/Language Rehabilitation
Andrew Goldfine1, Behdad Dehbandi2, Juliana Kennedy2, Briana Sabot2, Cory Semper2, David Putrino2
1Stony Brook Medicine, Stony Brook, NY, USA, 2Burke 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

Full abstracts can be found at www.asnr.com
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 Mullick1,3, Szu-Chen Hsu2,3, Sandeep Subramanian1,4, Nicolas Turpin3,5, Anatol Feldman3,4, Mindy Levin1,3
1School of Physical and Occupational Therapy, McGill University, Montreal, QC, Canada, 2Neuroscience Program, McGill University, Montreal, QC, Canada, 3Center for Interdisciplinary Research in Rehabilitation of Greater Montreal (CRIR), Laval, QC, Canada, 4Department of Neuroscience, Université de Montréal, Montreal, QC, Canada, 5School 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

Full abstracts can be found at www.asnr.com
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 Borich1, Lewis Wheaton2, Sonia Brodie3, Bimal Lakhani3, Lara Boyd3
1Emory University, Atlanta, Georgia, USA, 2Georgia Institute of Technology, Atlanta, Georgia, USA, 3University of British Columbia, Vancouver, British Columbia, Canada

Poster F3: Effect of Resveratrol on Relapsing-Remitting Multiple Sclerosis
MS
Matthew Davis2, Pradeep Sahota1, 2Mahesh Thakkar 1, 2
1 Harry S. Truman Memorial Veterans Hospital, 2University 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. Theriault1, 4, Vincent Huang3, Gale Whiteneck3, Marcel P. Dijkers2, Noam Y. Harel2, 4
1New York Institute of Technology, Old Westbury, NY, USA, 2Icahn School of Medicine at Mount Sinai, New York, NY, USA, 3Craig Hospital, Englewood, CO, USA, 4James 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 Yung1, Shivani Kastuar2, Jason B. Carmel1, Ann M. Spungen1, 2, William A. Bauman1, 2, Noam Y. Harel1, 2
1James J. Peters VA Medical Center, Bronx, NY, USA, 2Icahn School of Medicine at Mount Sinai, New York, NY, USA, 3Burke 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 Turpin1, 3, Rim Rahal1, 3, Sandeep Subramanian2, 3, Mindy Levin2, 3, Anatol Feldman1, 3
1Department of Neuroscience, Université de Montréal, Montréal, Canada, 2School of Physical and Occupational Therapy, McGill University, Montréal, Canada, 3Center 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 Kim1, Lara Alley1, Trina DeMott2, James. K. Richardson2, James. A. Ashton-Miller1
1University of Michigan, Department of Mechanical Engineering, Ann Arbor, MI, USA, 2University of Michigan Health System, Department of Physical Medicine & Rehabilitation, Ann Arbor, MI, USA, 3National Rehabilitation Center, Seoul, Republic of Korea, 4Hôpitaux 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 Sangani1, Taichi Kurayama2, Joyce Fung1,3
1Jewish Rehabilitation Hospital, Feil/Oberfeld/CRIR Research Centre, Laval, Quebec, Canada, 2Chiba University, Chiba, Japan, 3McGill 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 Chevalley1, Thomas Schmidlin2, Daniel Perez-Marcos3, Gangadhar Garipelli3, Robert Leeb3, Cynthia Duc3, Ron Vollen3, Philippe Vuadens3, Tej Tadi1, Olaf Blanke1,2, José d.R. Millán2,3,5
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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 McGregor1,2, Joe Nocera1,2, Bruce Crosson1,2, Andrew Butler1,3
1Center for Neurocognitive and Visual Rehabilitation, Atlanta VAMC, Decatur, GA, USA, 2Emory University, Department of Neurology, Decatur, GA, USA, 3Georgia State University, Department of Physical Therapy, Atlanta, GA, USA

Poster F13: Improvements in Visual Search Contribute to Visuomotor Learning
Motor Rehabilitation
Christopher Perry1, Tarkeshwar Sighn1, Kayla Goins1, Barbara Marebwa2, Troy Herter1
1University of South Carolina, Columbia, SC, USA, 2University 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

Full abstracts can be found at www.asnr.com
Poster F15: An Interprofessional Case Study: Training Health Profession Students in Clinical Exercise Therapy for People with Parkinson’s Disease

Motor Rehabilitation

Theresa Sweeney, 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 Philip1,2, Scott Frey1,2

1Washington University, St. Louis, MO, USA, 2University of Missouri, Columbia, MO, USA

Poster F17: Manual Asymmetry During a Bilateral Reach and Hold Task

Motor Rehabilitation

Elizabeth J. Woytowicz1, Jill Whitall1,2, Kelly Westlake1, Robert L. Sainburg3,4

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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 Rivas1,2, Arlette Doussoulin3, José Luis Saiz3, Sarah Blanton5

1Universidad de La Frontera, Departamento de Especialidades Médicas, Temuco, Chile, 2Clinica Alemana Temuco, Servicio de Medicina Física y Rehabilitación, Temuco, Chile, 3Universidad de La Frontera, Departamento de Pediatría y Cirugía Infantil, Temuco, Chile, 4Universidad de La Frontera, Departamento de Psicología, Temuco, Chile, 5Rehabilitation Center, Emory University, Atlanta, USA

Poster F21: Is Structural Connectivity of Basal Ganglia Associated with Learned Non-Use in Chronic Stroke?

Motor Rehabilitation

Bokkyu Kim1, Youngmin Oh1,2, Richard Leahy3,4, Justin Haldar3,4, Nicolas Schweighofer1,2, Carolee Weinstein1

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Full abstracts can be found at www.asnr.com
Poster F22: Toward a Self-Calibrating Brain-Computer Interface for People with Tetraplegia
Motor Rehabilitation
Beata Jarosiewicz1,2, Anish Sarma1,2, John Simeral2,1, Daniel Bacher1, Jad Saab1, Brittany Sorice3, Christine Blabe1, Sydney Cash1,3, Emad Eskandar3, Krishna Shenoy4, Jaimie Henderson1, Leigh Hochberg2,1
1Brown University, Providence, RI, USA, 2Dept. of VA Medical Center, Providence, RI, USA, 3Massachusetts General Hospital, Boston, MA, USA, 4Stanford University, Stanford, CA, USA, 5Harvard 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 Seo1, Kishor Lakshminarayanan2, Brian Schmit3
1Medical University of South Carolina, Charleston SC, USA, 2University of Wisconsin-Milwaukee, Milwaukee WI, USA, 3Marquette University, Milwaukee WI, USA

Stroke
Rachel Wurzman1, Denise Harvey1,3, Olufunsho Faseyitan1,2, Daniela Sacchetti1,2, Roy Hamilton1,2
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Poster F25: Paired Brain and Spinal Cord Stimulation to Strengthen Corticospinal Responses
Motor Rehabilitation
Asht Mishra1, Disha Gupta1, Ajay Pal1, Jason Carmel1,2
1Burke Medical Research Institute, White Plains, NY, USA, 2Weill Cornell Medical College, New York, NY, USA

Poster F26: Impaired Multi-Finger Synergies in Individuals with Multiple Sclerosis
MS
Daniela Mattos1,3, Hang Jin Jo1, Elisabeth Lucassen1,2, Mark L. Latash1
1Pennsylvania State University, State College, PA, USA, 2Pennsylvania State University-Milton S. Hershey Medical Center, Hershey, PA, USA, 3University 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 Antonescu1,3, Matthew Jeffer1,3, Jessica Livingston-Thomas1,3, Cindi Morshead2, Dale Corbett1,3
1University of Ottawa, Ottawa, Canada, 2University of Toronto, Toronto, Canada, 3Canadian 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
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 Schaefer1,2, Jeffrey Nielsen1, Tyson Lamberas1, Kevin Duff2
1Utah State University, Logan, UT, USA, 2University 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 Rafferty1,2, Samantha Keil2, Daniel Corcos1
1Northwestern University, Chicago, IL, USA, 2University 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 Wu1, Yupeng Ren2,3, Li-Qun Zhang2,3
1University of Massachusetts Lowell, Lowell, MA, USA, 2Rehabilitation Institute of Chicago, Chicago, IL, USA, 3Northwestern University, Chicago, IL, USA

Poster F33: Comparing Mirror Visual Feedback and Actual Visual Feedback Post Stroke
Motor Rehabilitation
Qiang Lin1,2, Viswanath Aluru1, David Geller1, David Rhee1, Sravani Mudumbi3, Priya Bolikal3, Eric Altschuler4, Ying Lu3, Preeti Raghavan1
1New York University School of Medicine, New York, USA, 2the First Affiliated Hospital of Sun Yat-sen University, Guangzhou, China, 3New York University, New York, USA, 4University of Medicine and Dentistry of New Jersey, New Jersey, USA, 5Johns Hopkins University, Maryland, USA

Poster F34: Discriminating Visuospatial Neglect from Proprioceptive Impairment using Robotics
Stroke
Janice E. Yajure1,2, Jennifer A. Semrau1,2, Troy M. Herter1, Stephen H. Scott3, Sean P. Dukelow1,2
1University of Calgary, Calgary, AB, Canada, 2Hotchkiss Brain Institute, Calgary, AB, Canada, 3Queen’s University, Kingston, ON, Canada, 4University 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 Tang1, Viswanath Aluru1, Mohamed Hassan3, Lauri Bishop2, Joel Stein2, Preeti Raghavan1
1New York University School of Medicine, New York, New York, USA, 2Columbia University, New York, New York, USA, 3New York University Physical Therapy, New York, New York, USA

Full abstracts can be found at www.asnr.com

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Poster F37: Statin Medication Use and Nosocomial Infection Risk in the Acute Phase of Stroke
Stroke
Douglas Weeks1, Christopher Greer1, Megan Willson2
1St. Luke's Rehabilitation Institute, Spokane, WA, USA, 2Providence 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 Putrino1,2, Helma Zanders1, Avrielle Rykman1, Peter Lee1, Luis Disla3, Owais Naeem3, Tanjin Panna3, Dylan Edwards1,2
1Burke Medical Research Institute, White Plains, NY, USA, 2Cornell University, New York, NY, USA, 3GesTherapy, 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 Yang1, Vicki Gray1, Masahiro Fujimoto2, Sandy McCombe Waller1, Mark Rogers1
1University of Maryland Baltimore, Baltimore, MD, USA, 2Ritsumeikan University, Kusatsu, Japan

Poster F40: Towards Assessing Mobility in Parkinson’s Disease Patients Using a Single 3D Sensor
Motor Rehabilitation
Luciano Nocera1, Helen R. Bacon2, Jiun-Yu Kao1, Yu-Chen Chung2, Yi-An Chen2, Lorraine Sposto1, Beth E. Fisher2, Cyrus Shahabi3, Carolee J. Weinstein2
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Poster F41: Rehabilitation-Based Motor Pattern Differences after Biological and Bionic Therapies in Spinal Cord Injury (SCI)
Motor Rehabilitation
David Logan1, John K. Lee1,2, Qi Yang1, Simon F. Giszter1,2
1Neurobiology & Anatomy, Drexel University College of Medicine, Philadelphia, PA, USA, 2Biomedical 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 Aguilar1,2, Omar Shanta1, Thuong Tran1, David Reinkensmeyer1, Sumner Norman1
1University of California, Irvine, Irvine, California, USA, 2Purdue University, West Lafayette, Indiana, USA

Full abstracts can be found at www.asnr.com
Poster F44: Employing Patient’s Individual Characteristics to Derive Personalized Brain Stimulation Therapies
Stroke
Vishwanath Sankarasubramanian¹, Nicole Varnerin¹, David Cunningham¹, Kelsey Potter-Baker¹, Ken Sakaie¹, Adriana Conforto², Andre Machado¹, Ela Plow¹
¹Cleveland Clinic, Cleveland/Ohio, USA, ²Sao Paulo University, Sao Paulo, Brazil

Poster F45: Compensatory Stepping in People with Multiple Sclerosis
MS
Daniel Peterson¹ ², Jessie Huisinga³, Fay Horak¹ ²
¹Veterans Affairs Portland Health Care System, Portland, OR, USA, ²Oregon Health & Science University, Portland, OR, USA, ³University 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 Niso², Sylvain Baillet², Elizabeth Bock², Patricia da Cunha Belchior¹, Marie-Hélène Boudrias¹
¹School of Physical & Occupational Therapy, McGill University, Montreal, Quebec, Canada, ²McConnell 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 Wutzke¹ ³, Shashwati Geed¹, Evan Chan², Rachael Harrington¹ ³ ⁴, Michelle Harris-Love³ ⁵
¹Veterans Affairs Medical Center, Washington, District of Columbia, USA, ²MedStar Health Research Institute, Washington, District of Columbia, USA, ³MedStar National Rehabilitation Hospital, Washington, District of Columbia, USA, ⁴Georgetown University, Washington, District of Columbia, USA, ⁵George Mason University, Fairfax, Virginia, USA

Poster F48: Clinical Characteristics Changes of Phantom Phenomen After Traumatic Limb Amputation
Sensory Rehabilitation
Widjajalaksmi Kusumaningsih
Department of Rehabilitation 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. MacLean¹, O.E. Krigolson², G.A. Eskes¹
¹Dalhousie University, Halifax, Nova Scotia, Canada, ²University 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 Robert¹ ², Krithika Sambasivan², Mindy F. Levin¹
¹Integrated Program in Neuroscience, McGill University, Montreal, Quebec, Canada, ²Center for interdisciplinary research in rehabilitation of greater montréal, Montreal, Quebec, Canada, ³School of Physical and Occupational Therapy, McGill University, Montreal, Quebec, Canada

Full abstracts can be found at www.asnr.com
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 Silva¹,², Gayatri Aravind¹, Samir Sangani³, Anouk Lamontagne¹,²
¹McGill University, School of Physical and Occupational Therapy, Montreal, Quebec/QC, Canada, ²McGill University, Integrated Program in Neuroscience, Montreal, Quebec/QC, Canada, ³Feil 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 Bergquist¹, Vishvek Babbar¹,², Saima Ali², Milos Popovic¹,², Kei Masani¹,²
¹Toronto Rehabilitation Institute, University Health Network, Toronto, Ontario, Canada, ²Institute 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 Cirillo¹,², Monica Perez²,³
¹University of Auckland, Auckland, New Zealand, ²University of Pittsburgh, Pittsburgh, PA, USA, ³University 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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Booth #5:
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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.
Booth #7:
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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 brain signals (EEG).

Booth #11:
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Booth #12:
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