

AMERICAN SOCIETY OF **NEUROREHABILITATION**

Annual Meeting



NOVEMBER 1-2, 2018
SAN DIEGO, CALIFORNIA
HILTON SAN DIEGO BAYFRONT



AMERICAN SOCIETY OF
NEUROREHABILITATION

WELCOME TO THE 2018 ASNR ANNUAL MEETING



On behalf of the American Society of Neurorehabilitation (ASNR), we are excited you are joining us for the 2018 Annual Meeting. Our meeting provides interactions among neurorehabilitation clinicians, basic scientists, industry representatives, and funders in a dynamic environment of presentations and discussion. This year symposia topics include:

- Spinal Plasticity after CNS Injury: Mechanisms and molecular correlates
- Genetics and Stroke Recovery
- Approaches to Manage Sensory Misalignment to Improve Functional Rehabilitation in the Upper Limb
- The Effects of Neuromodulation on Network Oscillatory Dynamics

We return with our popular Controversies in Neurorehabilitation panel in which experts and audience members will debate Biomarkers in Neurorehabilitation and Neural Repair. An oral abstract session will feature four of the top science abstracts. A new addition this year is the option of roundtable discussions on the topics of Traumatic Brain Injury Rehabilitation, Using and Managing Big Data, and the ASNR Clinical Research Network. We have left ample time for two poster sessions, which always generate stimulating discussion and provide outstanding opportunities for sharing science and networking.

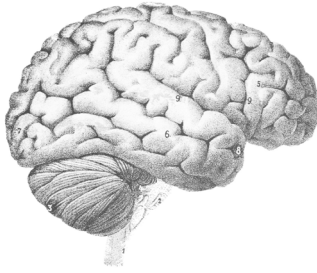
Also, don't miss out on the ASNR Business Meeting for a chance to see how the organization works, find out who are this year's poster award winners, and refuel with a provided boxed lunch. Enjoy a lively and diverse two days of interaction.

Sincerely,
Catherine E. Lang PT, PhD
2018 ASNR Program Committee Chair
Washington University School of Medicine

ON BEHALF OF THE PROGRAM COMMITTEE:

Cathrin Buetefisch, MD, PhD, FASNR
Jason Camel, MD, PhD
S. Thomas Carmichael, MD, PhD
Matthew Edwardson, MD
Teresa Kimberley, PT, PhD
Albert Lo, MD
Sangeetha Madhavan, PT, PhD

Kelsey Potter-Baker, PhD
W. Zev Rymer, PhD, MD
Heidi Schambra, MD
Keith Tansey, MD, PhD
Lewis Wheaton, PhD
Steven Wolf, PhD, PT, FASNR
Steven Zeiler, MD, PhD



BENEFITS OF MEMBERSHIP

Subscription to *Neurorehabilitation and Neural Repair*

First color page complimentary in printed *NNR* issue

Opportunity to serve on ASNR committees which provide guidance and carry out society initiatives

Access to *Journal Watch*

Reduced Annual Meeting fees

Access to the online directory

Networking opportunities with other neurorehabilitation professionals

MORE INFO AT ASNR.COM

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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; and the mission of neurorehabilitation research.

GENERAL MEETING INFORMATION

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HANDOUTS

All attendees will receive a link to 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.

ABSTRACTS

Abstract titles and presenters can be found on pages 16-30. Full text abstracts can be found online at www.asnr.com.

ANNUAL MEETING WIFI

Complimentary wifi will be available in the Annual Meeting space. Please visit registration for WiFi password.

ONSITE ASNR ANNUAL MEETING SURVEY

Please complete and return the Annual Meeting survey you received in your email prior to the meeting before you leave the meeting on Friday. Your responses will prove crucial to the future success of ASNR. Thank you!

ASNR TRAVEL FELLOWSHIPS FOR DIVERSITY

ASNR would like to thank the Eunice Kennedy Shriver National Institute Of Child Health & Human Development of the National Institutes of Health for their generous support of our Annual Meeting and in particular for support of the Diversity Travel Fellowship program.

JOIN THE DISCUSSION!



@ASNRRehab



#ASNRRehab18

PROGRAM AT-A-GLANCE

THURS. NOV. 1

7:00 - 8:00 am

Exhibits

7:00 am - 6:30 pm

Registration

8:00 - 10:00 am

**Spinal Plasticity after CNS Injury:
Mechanisms and molecular correlates**

Organizer:

Georgy Bakalkin, PhD

Speakers:

Georgy Bakalkin, PhD

James Grau, PhD

John Martin, PhD

Ian Winship, PhD

10:00 - 10:30 am

Break

10:30 am - 12:30 pm

Poster Session I

12:30 - 1:30 pm

Lunch

1:30 - 2:30 pm

Oral Abstract Sessions

**Spontaneous Motor Recovery after
Cerebrolysin Treatment in a Mouse Model
of Stroke** - *Steven Zeiler, MD, PhD*

**Effect of Behavioral Practice Targeted
at the Premotor-Prefrontal Component
of the Motor Network after Stroke** - *Jill
Stewart, PhD*

**Motor Cortex Inhibition with
Somatosensory and Transcranial Direct
Current Stimulation: A metaplasticity
study** - *John Cirillo, PhD*

**Does Cognition Predict Ability to Learn a
Novel Walking Pattern in Individuals Post
Stroke?** - *Margaret French, PT, DPT, NCS*

2:30 - 2:45 pm

Break

2:45 - 4:15 pm

Genetics and Stroke Recovery

Organizer:

Steven Cramer, MD, MMSc

Speakers:

Sunghee Cho, PhD

Steven Cramer, MD, MMSc

Mary Teena Joy, PhD

Jin-Moo Lee, MD, PhD

4:15 - 4:30 pm

Break

4:30 - 5:30 pm

2018 ASNR Award Lectures

**Outstanding Neurorehabilitation
Clinician-Scientist (ONCS) Award
Recipient**

**Moving Research in Stroke Rehabilitation
Forward.**

Gert Kwakkel, PhD, PT

**Kenneth Viste, Jr., MD Memorial
Lectureship Recipient**

**The Cognitive-motor Interface: What we
know, tells us where we're going.**

Laurel Buxbaum, PsyD

5:30 - 8:00 pm

Foundation Lecture

**Neuroscience: Data Rich,
Theory Poor**

Brad Voytek, PhD

Reception to follow

Reception tickets available at registration

FRI. NOV. 2

7:00 - 8:00 am

Exhibits

7:00 am - 5:30 pm

Registration

8:00 - 10:00 am

Approaches to Manage Sensory Misalignment to Improve Functional Rehabilitation in the Upper Limb

Organizer:

Lewis Wheaton, PhD

Speakers:

David Reinkensmeyer, PhD

Robert Sainburg, PhD

Lewis Wheaton, PhD

10:00 - 10:30 am

Break

10:30 am - 12:30 pm

Poster Session II

12:30 - 1:30 pm

ASNR Business Meeting

All Welcome & Lunch Provided

1:30 - 3:00 pm

The Effects of Neuromodulation on Network Oscillatory Dynamics

Organizer:

Karunesh Ganguly, MD, PhD

Speakers:

Leonardo Cohen, MD, FASNR

Flavio Frohlich, PhD

Karunesh Ganguly, MD, PhD

1:30 - 3:00 pm

Special Interest Roundtables

Expanding Your Toolkit: How can you use data science to streamline your research and tackle bigger questions?

Discussion Leaders:

Keith Lohse, PhD

Kenneth Ottenbacher, PhD, OT

Growing Your Clinical Research Program: How can you use the CRN seed grant to advance your clinical research program to the next step?

Discussion Leaders:

Daofen Chen, PhD

Theresa Hayes Cruz, PhD

Albert Lo, MD

Carolee Winstein, PhD, PT, FAPTA, FAHA

Traumatic Brain Injury (TBI) Rehabilitation

Discussion Leaders:

Rocio Norman, PhD, CCC-SLP

Mary Jo Pugh, PhD, RN

Sandeep Subramanian, PT, PhD

3:00 - 3:30 pm

Break

3:30 - 5:30 pm

Controversies in Neurorehabilitation: Biomarkers in Neurorehabilitation

Moderator:

Steven Zeiler, MD, PhD

Speakers:

Winston Byblow, PhD

Matthew Edwardson, MD

Albert Lo, MD

Sangeetha Madhavan, PT, PhD

5:30 - 6:30 pm

Closing Reception

PROGRAM DETAILS

Spinal Plasticity after CNS Injury: Mechanisms and molecular correlates

Thursday, November 1 • 8:00 - 10:00 am • Aqua Ballroom DEF

SCHEDULE:

8:00 - 8:30 am *Introduction. Motor Cortex and Spinal Cord Neuromodulation Produces Corticospinal Structural and Functional Plasticity to Promote Motor System Repair after Brain and Spinal Cord Injury* - John Martin, PhD

8:30 - 8:55 am *Modulating neuroplasticity in the spinal cord to improve recovery from stroke* - Ian Winship, PhD

8:55 - 9:20 am *Metaplastic modulation of spinal circuits: How alternative forms of stimulation can impact spinal cord plasticity* - James Grau, PhD

9:20 - 9:45 am *Motor impairment after traumatic brain injury: neuropeptide spinal mechanisms* - Georgy Bakalkin, PhD

9:45 - 10:00 am Discussion

SPEAKERS:



Georgy Bakalkin, PhD
Organizer



James Grau, PhD



John Martin, PhD



Ian Winship, PhD

Neuromodulation is an evolving therapy that targets specific neural circuits by a variety of stimuli including an electric current, a magnetic field, and chemical agents (neurohormones, growth factors, cytokines and enzymatic treatments). The speakers in this symposium, working in different experimental research areas, will focus on mechanisms and development of a translational neuromodulatory strategy to restore forelimb and hind limb function after CNS injuries. How motor cortex and spinal cord neuromodulation, alone and in combination, promotes corticospinal system functional and structural plasticity and motor function after injury will be discussed in the first talk. The second presentation will demonstrate that modulation of neuroplasticity in the spinal cord by targeted removal of plasticity-inhibiting signaling, via digestion of chondroin sulphate proteoglycans (CSPGs) with chondroitinase ABC or by blocking CSPG receptor interactions with the endogenous growth promoting molecule pleiotrophin, can induce potent plasticity of corticospinal projections to the spinal gray matter and improve recovery even during chronic stroke. The third presentation will show how stimulation affects spinal cord plasticity depending upon temporal and behavioral relations. Predictable/controllable stimulation may enable spinal cord plasticity through up-regulation of brain-derived neurotrophic factor. In contrast, noxious input that is unpredictable / uncontrollable appears to inhibit neural plasticity that is linked to up-regulation of the cytokine tumor necrosis factor. Finally, evidence that effects of unilateral brain injury on hind limb motor functions are partially mediated by opioid neurohormones will be presented suggesting a potential of selective opioid antagonists for pharmacological correction of motor deficits secondary to brain injury.

Oral Abstract Session

Thursday, November 1 • 1:30 - 2:30 pm • Aqua Ballroom DEF

1:30 pm **Spontaneous Motor Recovery after Cerebrolysin Treatment in a Mouse Model of Stroke** - Steven Zeiler, MD, PhD

1:45 pm **Effect of Behavioral Practice Targeted at the Premotor-Prefrontal Component of the Motor Network after Stroke** - Jill Stewart, PhD

2:00 pm **Motor Cortex Inhibition with Somatosensory and Transcranial Direct Current Stimulation: A metaplasticity study** - John Cirillo, PhD

2:15 pm **Does Cognition Predict Ability to Learn a Novel Walking Pattern in Individuals Post Stroke?** - Margaret French, PT, DPT, NCS



John Cirillo, PhD



Margaret French, PT,
DPT, NCS



Jill Stewart, PhD



Steven Zeiler, MD, PhD

Genetics and Stroke Recovery

Thursday, November 1 • 2:45 - 4:15 pm • Aqua Ballroom DEF

SCHEDULE:

2:45 - 3:03 pm *Pre-clinical genetic targets for stroke recovery* - Mary Teena Joy, PhD

3:03 - 3:21 pm *Impact of BDNF val66met SNP on functional recovery after stroke* - Sunghee Cho, PhD

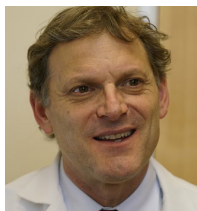
3:21 - 3:39 pm *Genetic influences on early neurological outcome after acute ischemic stroke* - Jin-Moo Lee, MD, PhD

3:39 - 3:57 pm *Genetic variation and stroke recovery* - Steven Cramer, MD, MMSc

3:57 - 4:15 pm *Discussion*

This course will examine preclinical and clinical studies of genetic factors in relation to outcomes after stroke. Genetic studies provide insights at the molecular level and can be translated bidirectionally between animals and humans. The first talk will examine how knocking down the activity of C-C chemokine receptor type 5 (CCR5) promotes stroke recovery in animals. The second talk will examine effects on stroke recovery of the val66met polymorphism in brain derived neurotrophic factor (BDNF), which is common in humans and which in mice is associated with larger acute impairments but greater adaptation and thus enhanced motor recovery. Morphological and synaptic adaptations underlying this polymorphism's effects on recovery will be discussed. The third talk will review human genomics approaches in the acute stroke setting and will introduce the Genetics of Early Neurological Instability after Ischemic Stroke (GENISIS) Study, which uses a quantitative phenotype (change in NIHSS score between 6 and 24 hours after stroke onset) to examine genetic influences on early neurological outcome after acute ischemic stroke. The fourth talk will review genetic correlates of stroke recovery in humans, with a focus on the BDNF val66met and Apolipoprotein E polymorphisms, as well as a polygene score that models human brain dopamine neurotransmission. Genetic research stands to elucidate mechanisms of recovery after stroke, provide insights into the basis for inter-subject variability in outcomes, and inform development of treatment approaches that target neural repair following stroke.

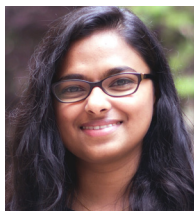
SPEAKERS:



Steven Cramer, MD,
MMSc
Organizer



Sunghee Cho, PhD



Mary Teena Joy, PhD



Jin-Moo Lee, MD, PhD

2018 ASNR AWARD CEREMONY

THURSDAY, NOVEMBER 1 • 4:30 - 5:30 PM • AQUA BALLROOM DEF

2018 FELLOWS OF AMERICAN SOCIETY OF NEUROREHABILITATION RECIPIENTS

The title of Fellow of the American Society of Neurorehabilitation is reserved for individuals who have contributed significantly to the field of Neurorehabilitation, and also to the American Society of Neurorehabilitation.

Gottfried Schlaug, PhD

Keith Tansey, MD, PhD

Carolee Winstein, PhD, PT, FAPTA, FAHA

4:35 pm

2018 OUTSTANDING NEUROREHABILITATION CLINICIAN-SCIENTIST AWARD RECIPIENT

The award, based on the evaluation of his or her peers, honors scholarly achievements and contributions to knowledge about mechanisms of neural repair, translational research from mechanisms of repair to clinical practice, or clinical Neurorehabilitation. Nominations are invited from the membership of the American Society of Neurorehabilitation.

The American Society of Neurorehabilitation Education Foundation Board of Directors, made up of Past Presidents of the American Society of Neurorehabilitation (ASNR) selects the recipient of the award.



Gert Kwakkel, PhD, PT

Moving research in stroke rehabilitation forward.

Gert Kwakkel, PhD, PT

5:05 pm

2018 KENNETH VISTE, JR., MD MEMORIAL LECTURESHIP RECIPIENT

Kenneth M. Viste, Jr., MD was a tireless advocate for Neurorehabilitation and ASNR, and was active in the organization since its inception as President, Membership Committee Chair and a member of the Practice Issues Committee. ASNR honors his memory by presenting the award annually to an individual that has supported the mission and vision of ASNR over the course of his or her career, by supporting neurorehabilitation as a field, engaging in clinical and educational work, and making our medical peers aware of the importance of neurorehabilitation.



Laurel Buxbaum, PsyD

The Cognitive-Motor Interface: What We Know Tells Us Where We're Going

Laurel Buxbaum, PsyD

ASNR FOUNDATION LECTURE

THURSDAY, NOVEMBER 1 • 5:30 - 6:00 PM • AQUA BALLROOM DEF

Plan to join us for a spirited presentation from Dr. Voytek. After our brains cannot take one last bit of information, we will gravitate to the Aqua Foyer and Terrace to take in some food, beverages, and relaxed conversation with colleagues.

Featured Talk:

Neuroscience: Data Rich, Theory Poor - Bradley Voytek, PhD

Neuroscience is creating data at an unprecedented rate. There is an explosion of “big data” initiatives in neuroscience, ranging from recording from thousands of neurons simultaneously, to massive repositories of thousands of peoples’ worth of human functional and structural brain imaging, to population-wide genetic data. Despite this wealth of data, major “theories of the brain” remain elusive. This has led many to lament that neuroscience is data rich, but theory poor. Here I argue that, through principled aggregation of these large, diverse neuroscience datasets, we can address critical issues in cognition and mental health. These data include textual data from the millions of peer-reviewed neuroscience publications, functional and structural brain imaging data, demographic and genetic information, neural electrophysiology, gene expression profiles, and neuronal and glial physiology. Through such aggregation and integration, we can mine the data to find missing links and gaps in our knowledge; we can algorithmically generate plausible hypotheses for us. That is, we leverage the wealth of neuroscience data to reduce the paucity of neuroscience theories.



Reception Tickets:

\$25 for ASNR Members

\$50 for Guests

(Tickets will be available to purchase at registration for the reception.)

Approaches to Manage Sensory Misalignment to Improve Functional Rehabilitation in the Upper Limb

Friday, November 2 • 8:00 - 10:00 am • Aqua Ballroom DEF

SCHEDULE:

8:00 - 8:05 am *Introduction* - Lewis Wheaton, PhD

8:05 - 8:35 am *Visual and proprioceptive alignment processes in basic control and stroke* - Robert Sainburg, PhD

8:35 - 9:05 am *Sensation, the missing limb, and prosthesis adaptation* - Lewis Wheaton, PhD

9:05 - 9:35 am *Robotic finger training after stroke and lost sensation* - David Reinkensmeyer, PhD

9:35 - 10:00 am *Questions and discussion*

Significant research has identified the necessity of sensory integration, particularly visual and proprioceptive senses, to support motor control. Yet, misalignment of these sensory inputs has the potential to negatively influence motor outcomes in upper limb pathology. In this presentation, we hope to stimulate thoughts from research in healthy persons, persons with stroke, and persons with amputation that have to undergo motor learning in the upper limb to understand how sensory misalignment influences motor learning and control. These studies will consider neurophysiological, behavioral, and clinical outcomes to describe a multidimensional model of sensory misalignment in the upper limb. Further, as an extension of the 2017 ASNR Pre-meeting, we will also consider how sensory misalignment intersects with implementation of technological advances in rehabilitation robotics, such as exoskeletons and prosthetics. While these devices have great potential to promote functional rehabilitation outcomes, it is possible that the present state of technology may show limitations in persons with sensory misalignment. We will further provide insights on how variables such as level of pathology, handedness, and cognition, differently influence these outcomes. Following the presentation, we hope to engage in a conversation on whether motor rehabilitation research should additionally consider sensory misalignment to potentially yield improved motor function.

SPEAKERS:



Lewis Wheaton, PhD
Organizer



David Reinkensmeyer,
PhD



Robert Sainburg, PhD

ASNR BUSINESS MEETING

Friday, November 2 • 12:30 - 1:30 pm

All welcome with lunch provided.

The Effects of Neuromodulation on Network Oscillatory Dynamics

Friday, November 2 • 1:30 - 3:00 pm • Aqua Ballroom DEF

SCHEDULE:

1:30 - 1:33 pm *Introduction* - Karunesh Ganguly, MD, PhD1:33 - 1:58 pm *Direct Current Stimulation to Modulate Oscillatory Dynamics in Rodents and Non-Human Primates* - Karunesh Ganguly, MD, PhD1:58 - 2:23 pm *Brain oscillatory activity and motor learning* - Leonardo Cohen, MD, FASNR2:23 - 2:48 pm *Network Neuromodulation: From Target Engagement to Treatment* - Flavio Frohlich, PhD2:48 - 3:00 pm *Discussion*

An important goal of neural engineering approaches to improving motor recovery after stroke is to develop generative models of neural circuit dynamics that may guide development of novel neuromodulatory approaches that dynamically target task-related processes. We specifically aimed to identify neurophysiological dynamics associated with skilled execution; assess whether these same dynamics are related to recovery; and finally, to evaluate whether temporally precise electrical neuromodulation of these dynamics can improve motor function post-stroke. Recent work has highlighted the importance of transient low-frequency oscillatory (LFO, < 4 Hz) activity in the healthy motor cortex (M1) during skilled upper-limb tasks. These brief bouts of oscillatory activity may establish the timing or sequencing of motor actions. Here we show that LFOs track motor recovery post-stroke and can be a physiological target for neuromodulation. In rodents, we found that reach-related LFOs, as measured in both the LFP and related spiking activity, were diminished after stroke and that spontaneous recovery was closely correlated with their restoration in perilesional cortex. Sensorimotor LFOs were also diminished in a human subject with chronic disability after stroke in contrast to two non-stroke subjects who demonstrated robust LFOs. Therapeutic delivery of electrical stimulation time-locked to the expected onset of LFOs was found to significantly improve skilled reaching in stroke animals. Moreover, we have recently conducted experiments in non-human primates that preliminarily suggest that this framework may also apply in primates. Together, our results suggest that restoration of cortical oscillatory dynamics is important for recovery of upper-limb function.

SPEAKERS:

Karunesh Ganguly,
MD, PhD
OrganizerLeonardo Cohen, MD,
FASNR

Flavio Frohlich, PhD

Controversies in Neurorehabilitation: Biomarkers in Neurorehabilitation

Friday, November 2 • 3:30 - 5:30 pm • Aqua Ballroom DEF

SCHEDULE:

- 3:30 pm - 3:35 pm *Introduction and rules of engagement* - Steve Zeiler, MD, PhD
 3:35 pm - 3:50 pm *Blood Biomarkers of Stroke Recovery are Promising and Should be More Widely Studied by the Neurorehabilitation Community* - Matthew A. Edwardson, MD
 3:50 pm - 4:05 pm *ALS, but What about These Great Neurophysiological Markers?* - Sangeetha Madhavan, PT, PhD
 4:05 pm - 4:20 pm *Biomarker-based Stratification is Essential in Stroke Motor Recovery Trials* - Winston Byblow, PhD
 4:20 pm - 4:35 pm *What Level of Evidence is Necessary for FDA Approval of a Biomarker, When ss FDA Approval Needed* - Albert Lo, MD
 4:35 pm - 5:30 pm *Open Forum*

There has been an explosion of research into biomarkers across biomedical science fields, and neurorehabilitation is no exception. New papers studying potential biomarkers for neurorehabilitation pop up in our literature searches on an almost daily basis. This leads one to wonder just what is (or could be) a biomarker, and how does a scientist or the field decide if and when a candidate biomarker moves from the research realm into clinical practice. This session will offer expert opinions in the field and stimulate debate with the audience around the following questions: What is the best source for neurorehabilitation biomarkers? Should biomarkers only come from blood/serum? What is the type and level of evidence needed before a responsible researcher should call something a biomarker? What is the level of evidence needed before a biomarker should be used to measure outcomes in trials? What is the level of evidence needed before a biomarker should be used in clinical practice? Our speakers will explore these issues across a variety of neurorehabilitation conditions and potential sources of biomarkers. We welcome invigorating audience participation in the second half of the session.

SPEAKERS:



Matthew Edwardson, MD
Organizer



Steve Zeiler, MD, PhD
Moderator



Winston Byblow,
PhD



Albert Lo, MD



Sangeetha Madhavan, PT, PhD

CLOSING RECEPTION

Aqua Ballroom Terrace • 5:30 - 6:30 pm

Keep the discussion going over small bites and cash bar.

SPECIAL INTEREST ROUNDTABLES

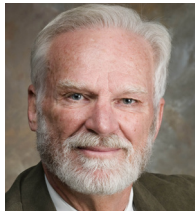
FRIDAY, NOVEMBER 2 • 1:30 - 3:00 PM • AQUA BALLROOM A

Expanding Your Toolkit: How can you use data science to streamline your research and tackle bigger questions?

Advancing the field of neurorehabilitation requires researchers to collectively gather, store, manage, and analyze vast amounts of data. These data take many forms including medical imaging, clinical assessments, electronic health records, or even wearable devices. In this roundtable, we want to discuss how to modernize your data “ecosystem” in-line with the NIH’s “Strategic Plan for Data Science” (including advanced data storage, management, and analysis methods).



Keith Lohse, PhD



Kenneth Ottenbacher,
PhD, OT

Traumatic Brain Injury (TBI) Rehabilitation

Traumatic Brain Injury (TBI) is a leading cause of adult morbidity and mortality in the US. The direct and indirect costs, including loss of productive workdays, cost the economy an average of \$60 billion each year. Research has shown that individuals with TBI experience difficulty with mobility, communication and community reintegration. This roundtable discussion will provide a holistic review of the impact of TBI on functional recovery and outcomes informing rehabilitation research and practice. The roundtable moderators, all of whom have active programs of research related to TBI, will facilitate a roundtable discussion regarding issues related to developing research in this area as well as the challenges of translating this research into meaningful clinical practice.



Rocío Norman, PhD,
CCC-SLP



Mary Jo Pugh, PhD,
RN



Sandeep Subramanian,
PT, PhD

Growing your Clinical Research Program: How can you use the CRN seed grant to advance your clinical research program to the next step and become a funded investigator in neurorehabilitation?

Large multi-site clinical research projects are not born fully grown. Instead they develop through carefully crafted and well thought through steps, often beginning with a small seed grant like the one ASNR offers. This round table will discuss a number of critical issues pertaining to growing your clinical research program. These issues include: lessons learned from previous clinical trials of neurorehabilitation; the importance of grantsmanship and identification of “critical knowledge gaps” for proposals; and how the seed grant mechanism can be used to grow your clinical research program.

Discussion Questions:

- What are some of the lessons learned from the rehabilitation clinical trials attempted in the past decade and what NINDS and NCMRR can do in working with the clinical research community to move the field forward?
- As a new neurorehab clinical investigator, what role do I see myself in contributing to the neural rehabilitation clinical research enterprise?
- How do I decide what constitutes a “critical knowledge gap”, in becoming a funded investigator in neurorehabilitation?
- How can I think about using a small seed grant to advance my research program toward addressing a critical knowledge gap in neurorehabilitation?



Daofen Chen, PhD



Theresa Hayes Cruz,
PhD



Albert Lo, MD



Carolee Winstein, PhD,
PT, FAPTA, FAHA

POSTER SESSION I

THURSDAY, NOVEMBER 1 • 10:30 - 12:30 PM • AQUA BALLROOM ABC

T1: Effects of TDCS Electrode Size on Motor Cortical Excitability of the Quadriceps Muscles

Aviroop Dutt-Mazumder, Scott Brown, Edward Washabaugh, Aastha Dharia, Reesha Talati, Amanda Vogel, Adam Gardi, [Chandramouli Krishnan](#)
Univ. of Michigan, Ann Arbor, USA

T2: Evaluation of Motor Cortical Excitability using Evoked Torque Responses: A New Tool with High Reliability

Aviroop Dutt-Mazumder, Edward Washabaugh, Scott Brown, [Chandramouli Krishnan](#)
Univ. of Michigan, Ann Arbor, USA

T3: Telerehabilitation: Post-MCA stroke: A literature review

Abhi Jain, [Jennifer Mao](#)
Philadelphia College of Osteopathic Medicine

T4: Lower Limb Transcranial Magnetic Stimulation Measures in the Ipsilesional Hemisphere after Stroke: Reliability and relationship with lower limb motor function

*2017 Clinical Research Network (CRN) Grant Recipient
Hui-Ting Goh¹, Kendall Connolly¹, Jenna Hardy¹, Delaina Walker-Batson^{1,2}
¹Texas Woman's Univ., Dallas, USA. ²The Stroke Center-Dallas, Dallas, USA

T5: Task Practice Intensity Estimation in Individuals with Traumatic Brain Injury

[Sandeep Subramanian](#)¹, Jericho Barela¹, Laura Landry¹, Bryan Sheffield¹, Esequiel Salcedo², Patricia Rivera³, Elizabeth Koyle³, Jesse Neeley^{3,4}, Ramesh Grandhi^{5,3}
¹Physical Therapy, UT Health San Antonio, San Antonio, USA. ²School of Nursing, UT Health San Antonio, San Antonio, USA. ³Univ. Hospital-Univ. Health System, San Antonio, USA. ⁴Rehabilitation Medicine, UT Health San Antonio, San Antonio, USA. ⁵Neurosurgery, UT Health San Antonio, San Antonio, USA

T6: Predicting Lower Extremity Motor Recovery After Stroke: Imaging biomarker improves motor score predictions

Fanny Munsch^{1,2}, Thomas Tourdias^{3,4}, Igor Sibon^{3,4}, Vincent Dousset^{3,4}, [Gottfried Schlaug](#)^{1,2}
¹BIDMC, Boston, USA. ²Harvard Medical School, Boston, USA. ³CHU Bordeaux, Bordeaux, France. ⁴Bordeaux Univ., Bordeaux, France

T7: The Kinect Motion Capture Reachable Workspace as an Assessment for Stroke Recovery

[Vicky Chan](#), Gregorij Kurillo, Maya Hatch, Jay Han
Univ. of California, Irvine, Irvine, USA

T8: Paired Brain and Spinal Cord Stimulation Strengthens Spared Spinal Circuits After Injury

Ajay Pal¹, Aldo Garcia-Sandoval², Shivakeshavan Ratnadurai-Giridharan¹, Qi Yang¹, Thelma Bethea¹, Aditya Ramamurthy¹, Tong-Chun Wen¹, Walter Voit², Jason Carmel^{1,3}
¹Burke Neurological Inst., White Plains, NY, USA. ²Dept. of Mechanical Engineering, Dept.s of Materials Science and Engineering and Bioengineering, The Univ. of Texas at Dallas, Richardson, Texas, USA. ³Brain Mind Research Inst. and Dept.s of Neurology and Pediatrics, Weill Cornell Medicine, New York, NY, USA

T9: Motor Function as Predictor of Inpatient Length of Stay and Discharge Destination in Stroke Rehabilitation

Martje Tazelaar, Martine Eckhardt, Irene Ploeg, Majanka Heijnenbroek, Gerard Ribbers
 Rijndam Rehabilitation Centre, Rotterdam, Netherlands

T10: Pupillary Response to Dual-tasking in Parkinson's Disease: A proof-of-concept study

Melike Kahya, Kelly Lyons, Rajesh Pahwa, Abiodun Akinwuntan, Hannes Devos
 Univ. of Kansas Medical Center, Kansas City, USA

T11: History of Depression and Antidepressant Use at Stroke Onset and Post-Stroke Post-Acute Rehabilitation Care: The Brain Attack Surveillance in Corpus Christi (BASIC) Project

Eric Stulberg^{1,2}, Liming Dong¹, Alexander Zheutlin¹, Sehee KIM¹, Edward Clafflin¹, Leslie Skolarus¹, Lewis Morgenstern¹, Lynda Lisabeth¹
¹Univ. of Michigan, Ann Arbor, USA. ²Northwestern Univ. Feinberg School of Medicine, Chicago, USA

T12: Interlimb Differences during Bimanual Aiming after Stroke: Effect of target distance

Rini Varghese¹, Robert Sainburg², James Gordon¹, Carolee Winstein¹
¹Univ. of Southern California, Los Angeles, USA. ²Dept. of Kinesiology and Neurology, Penn State Univ.

T13: Effects of the Aerobic Exercise with Limbs Compression and Body Cooling on Individuals with Post-Concussion Syndrome

Yi-Ning Wu¹, Jessica Gravel², Matthew White², Josh Avery², Terrie Enis², Caroline Stark¹, Robert Cantu²
¹Univ. of Massachusetts Lowell, Lowell, USA. ²Emerson Hospital, Concord, USA

T14: Repeated AbobotulinumtoxinA Injections Benefit Walking Speed, Step Length and Cadence in Adults with Spastic Hemiparesis due to Stroke or Traumatic Brain Injury

Alberto Esquenazi¹, Allison Brashear², Thierry Deltombe³, Brian Carlson⁴, Anne-Sophie Grandoulier⁵, Claire Vilain⁵, Philippe Picaut⁵, Jean-Michel Gracies⁶
¹MossRehab Gait and Motion Analysis Laboratory, Elkins Park, USA. ²Wake Forest School of Medicine, Winston-Salem, USA. ³Centre Hospitalier Universitaire UCL Namur site Mont-Godinne, Yvoir, Belgium. ⁴Ipsen Biopharmaceuticals, Basking Ridge, USA. ⁵Ipsen Pharma, Les Ulis, France. ⁶EA 7377 BIOTN, Université Paris-Est, Hospital Albert Chenevier-Henri Mondor, Service de Rééducation Neurolocomotrice, Créteil, France

T15: The Natural Trajectory of Upper Limb Performance in Daily Life Over the First 12-Weeks After Stroke

Kimberly Waddell, Michael Strube, Rachel Tabak, Catherine Lang
Washington Univ., Saint Louis, USA

T16: Variability of Leg Movements Across Seven Days during Early Infancy

Weiyang Deng, Beth Smith
Univ. of Southern California, Los Angeles, USA

T17: Development and Validation of Virtual Prism Adaptation Therapy in Subacute Stroke Patients with Hemispatial Neglect

Won-Seok Kim, Sungmin Cho, Jihong Park, Seo Hyun Park, Nam-Jong Paik
Seoul National Univ. Bundang Hospital, Seongnam-si, Republic of Korea

T18: Contralesional Hindlimb Motor Response Induced by Unilateral Brain Injury: Evidence for extra spinal mechanism

Nikolay Lukoyanov¹, Liliana Carvalho¹, Hiroyuki Watanabe², Mengliang Zhang³, Daniil Sarkisyan², Olga Kononenko², Igor Bazov², Tatiana Yakovleva², Jens Schouenborg⁴, Georgy Bakalkin²
¹Instituto de Investigação e Inovação em Saúde, Instituto de Biologia Molecular e Celular, Departamento de Biomedicina da Faculdade de Medicina da Universidade do Porto, Porto, Portugal. ²Dept. of Pharmaceutical Biosciences, Uppsala Univ., Uppsala, Sweden. ³Dept. of Molecular Medicine, Univ. of Southern Denmark, Odense, Denmark. ⁴Neuronano Research Center, Dept. of Experimental Medical Science, Lund Univ., Lund, Sweden

T19: Effects of Remote Limb Ischemic Conditioning on Motor Learning and Muscle Strength in Healthy Young Adults: Phase I randomized controlled trial

Swati Surkar¹, Anna Mattlage¹, Marghuretta Bland¹, Jeff Gidday², Ling Chen¹, Tamara Hershey¹, Jin-Moo Lee¹, Catherine Lang¹
¹Washington Univ. School of Medicine, St. Louis, USA. ²LSU School of Medicine, New Orleans, USA

T20: Stroke Recovery and the Effects of Intermittent Theta Burst Stimulation on Interhemispheric Inhibition

Rose Melchers, Mariana Leriche Vazquez, John Reynolds
Otago Univ., Dunedin, New Zealand

T21: A Systematic Review Exploring Brain Activity to Index Neural Activity in Relation to Sensorimotor Upper Limb Impairment and Activities After Stroke

Lisa Tedesco Triccas¹, Sarah Meyer¹, Kenneth Camilleri², Dante Mantini¹, Tracey Camilleri², Geert Verheyden¹
¹KU Leuven, Leuven, Belgium. ²Univ. of Malta, Msida, Malta

T22: Is Cerebral Blood Flow a Potential Marker of Transcranial Direct Current Stimulation Induced Cortical Modulation in Chronic Stroke Survivors?

Pooja Iyer, Sangeetha Madhavan
Univ. of Illinois at Chicago, Chicago, USA

T23: High Intensity Speed-based Treadmill Training Enables Walking Capacity and Neural Plasticity in Chronic Stroke Survivors

Hyosok Lim, Sivaramakrishnan Anjali, Pooja Iyer, Sangeetha Madhavan
Univ. of Illinois at Chicago, Chicago, USA

Abstract titles are printed as submitted by the author. Full abstracts can be found at www.asnr.com

T24: Recovery of Gait Speeds is not Associated with TMS Induced Lower Limb Corticomotor Responses

Anjali Sivaramakrishnan, Sangeetha Madhavan
Univ. of Illinois at Chicago, Chicago, USA

T25: Exercise-Dependent Upregulation of Angiogenic Proteins and Motor Function Recovery after Photothrombotic Stroke in Mice

*Presidential Award Finalist
 Abdullah Al Shoyaib, Faisal F. Alamri, Abbie Biggers, Srinidhi Jayaraman, Fakhrul Ahsan, Taslim A. Al-Hilal, Vardan T. Karamyan
Texas Tech Univ. Health Sciences Center, Amarillo, USA

T26: Transcranial Direct Current Stimulation Plus Concurrent Activity May Influence Task Prioritization During Walking in People with Parkinson's Disease

Jyutika Mehta¹, Christina Criminger², Chad Swank¹, Sattam Alumutairi¹
¹Texas Woman's Univ., Dallas, USA. ²Winston-Salem State Univ., Winston-Salem, USA

T27: Flexion Synergy Dependent Cortical Activity and Associated White Matter Changes During Attempted Paretic Hand Opening in Moderate to Severe Chronic Stroke

Kevin Wilkins, Jun Yao, Meriel Owen, Carson Ingo, Julius Dewald
Northwestern Univ., Chicago, USA

T28: The Cellular Effects of rTMS in Healthy and Stroke-Damaged Brains: An in vivo intracellular electrophysiological study in the rat

Natalie Matheson¹, Simon Fisher², Jon Shemmell¹, John Reynolds¹
¹Univ. of Otago, Dunedin, New Zealand. ²Univ. of Otago

T30: AbobotulinumtoxinA Using 2-mL Dilution Maintains Durable Functional Improvements Across Multiple Treatment Cycles

Khashayar Dashtipour¹, Gustavo Suarez², Pascal Maisonobe³, Laxman Bahroo⁴, Daniel Truong⁵, Richard Trosch⁶
¹Loma Linda Univ. School of Medicine, Loma Linda, USA. ²Ipsen Biopharmaceuticals, Basking Ridge, USA. ³Ipsen Pharma, Boulogne-Billancourt, France. ⁴Georgetown Univ. Hospital Pasquerilla Healthcare Center, Washington DC, USA. ⁵The Parkinson and Movement Disorder Inst., Fountain Valley, USA. ⁶Parkinson's and Movement Disorders Center, Farmington Hills, USA

T31: Can Paired Associative Stimulation be used to Modulate Resting-state Intracortical Connectivity?

*Presidential Award Finalist
 Andrew Hooyman, Alex Garbin, Beth Fisher, Jason Kutch, Carolee Winstein
Univ. of Southern California, Los Angeles, USA

T33: Chronic Stroke Patients Using a Brain-Computer Interface for Motor Rehabilitation: A group study

Christoph Guger^{1,2,3}, Fan Cao^{1,3}, Katrin Mayr¹, Günter Edlinger^{1,2,3}
¹Guger Technologies OG, Graz, Austria. ²g.tec medical engineering GmbH, Schiedberg, Austria. ³g.tec neurotechnology Inc., Albany, USA

T34: Exploring the Use of Visuospatial Tests to Predict Motor Learning Capacity in Older Adults

Jennapher Lingo VanGilder¹, Keith Lohse², Sydney Schaefer¹

¹Arizona State Univ., Tempe, USA. ²Univ. of Utah, Salt Lake City, USA

T35: Convergence of Biological and Artificial Learning: Electroencephalography-Informed Adaptation of Neurorehabilitation Robots to Maximize Cognitive Engagement

Neelesh Kumar¹, Nick Georgiou^{1,2}, Konstantinos Michmizos¹

¹Rutgers Univ., Piscataway, USA. ²Univ. of Virginia, Charlottesville, USA

T37: Non-invasive Cervical Root Stimulation for Spinal Cord Injury

Jonah Levine¹, Yu-Kuang Wu^{2,1}, Sana Saeed¹, James LiMonta¹, Matthew Maher¹, Eric Bailey¹, Jaclyn Wecht¹, Noam Y. Harel^{1,2}

¹James J. Peters VAMC, New York, USA. ²Icahn School of Medicine, New York, USA

T38: Simultaneous tDCS and Gait Rehabilitation in Chronic Stroke, A Pilot Study

Jessica McCabe¹, Margaret Skelly¹, Elizabeth Hardin¹, Marom Bikson², Svetlana Pundik^{1,3}

¹Louis Stokes Cleveland VA Medical Center, Cleveland, USA. ²The City College of New York of the City Univ. of New York, New York, USA. ³Case Western Reserve Univ., Cleveland, USA

T40: Surface EMG-triggered Closed Loop Stimulation for Individuals with Spinal Cord Injury: A case report

Yu-Kuang Wu^{1,2}, Jonah Levine¹, Jaclyn Wecht¹, James Limonta¹, Matthew Maher¹, Eric Bailey¹, Sana Saeed¹, Noam Harel^{1,3,4}

¹Bronx Veterans Medical Research Foundation, Bronx, USA. ²Dept. of Rehabilitation Science Icahn School of Medicine at Mount Sinai, New York, USA. ³Dept. of Neurology Icahn School of Medicine at Mount Sinai, New York, USA. ⁴Dept. of Rehabilitation Medicine Icahn School of Medicine at Mount Sinai, New York, USA

T41: Inpatient Cognitive Rehabilitation following Traumatic Brain Injury: Main Effects and Patient by Therapy Interactions using Causal Inference Models

Keith Lohse, Tianyu Zheng, Tom Greene, Jacob Kean, Angela Presson, Jincheng Shen
Univ. of Utah, Salt Lake Cty, USA

T42: Identifying the Optimal Resistance to Increase Unilateral Propulsion Force with a Novel Mechanical Gait Training Device

Krista Fjeld¹, Terence Thomas¹, Siyao Hu^{2,3}, Katherine Kuchenbecker^{4,3}

¹SUNY Stony Brook, Stony Brook, NY, USA. ²Schlumberger-Doll Research Center, Cambridge, MA, USA. ³Univ. of Pennsylvania, Philadelphia, PA, USA. ⁴Max Planck Inst. for Intelligent Systems, Stuttgart, Germany

T43: Cortical Inhibitory/Excitatory Balance during Dynamic Plantarflexion Scales with Walking Speed

Caitlin Banks^{1,2}, Virginia Little², Qian Ding^{3,2},Carolynn Patten^{2,1,3}

¹Univ. of California, Davis, Davis, CA, USA. ²VA Northern California Healthcare System, Martinez, CA, USA. ³UC Davis School of Medicine, Sacramento, CA, USA

T45: Astrocytic Mechanisms of Neuronal Synchronization and Local Plasticity in Motor Learning: A Computational Study

Ioannis Polykretis, Vladimir Ivanov, Konstantinos Michmizos
Rutgers Univ., Piscataway, USA

T46: A Three-dimensional Quantitative Model of Finger and Hand Kinematics During Functional Tasks

Tomas Oppenheim¹, Jenny Trieu², Adelyn Tu-Chan², Karunesh Ganguly²
¹*California State Univ. Maritime Academy, Vallejo, USA.* ²*Univ. of California San Francisco, San Francisco, USA*

T47: Changes in Corticomotor Excitability Associated with Successful Recovery of Upper Extremity Motor Function Post Stroke

Shashwati Geed^{1,2}, Farhanaz Nowshin², Jessica Barth², Michelle Harris-Love³, Peter Lum⁴, Alexander Dromerick^{2,1}

¹*Georgetown Univ. Medical Center, Washington, DC, USA.* ²*MedStar National Rehabilitation Hospital, Washington, DC, USA.* ³*George Mason Univ., Fairfax, VA, USA.* ⁴*The Catholic Univ. of America, Washington, DC, USA*

T48: Home-based Daily Exercises Using Wearable Motion Sensors for Community Dwelling Stroke Survivors with Hemiparesis

Jeremy Fidock, Marissa Wuennemann, Avrielle Rykman Peltz, Dylan Edwards
Burke Neurological Inst., White Plains, USA

T49: Concurrent Reorganization in Cortex and Striatum During Motor Recovery after Stroke

Ling Guo^{1,2}, Seok-Joon Won², Karunesh Ganguly^{1,2}

¹*Univ. of California, San Francisco, San Francisco, USA.* ²*San Francisco Veterans Affairs Medical Center, San Francisco, USA*

T50: Corticospinal Tract Wiring and Brain Lesion Characteristics in Unilateral Cerebral Palsy: Determinants of upper limb motor and sensory function

Cristina Simon-Martinez¹, Ellen Jaspers², Lisa Mailleux¹, Els Ortibus¹, Katrijn Klingels^{1,3}, Nicole Wenderoth², Hilde Feys¹

¹*KU Leuven, Leuven, Belgium.* ²*ETH Zurich, Zurich, Switzerland.* ³*Hasselt Univ., Hasselt, Belgium*

T51: Case Study - The effect of the use of an EMG-driven FES device for finger extension on the expression of the flexion synergy in an individual with severe hemiparetic stroke

Dylan Fitzsimons¹, Carolina Carmona¹, Kevin B. Wilkins¹, Justin Drogos¹, Julius P. A. Dewald^{2,3,1}, Jun Yao¹

¹*Dept. of Physical Therapy and Human Movement Sciences, Northwestern Univ., Chicago, USA.* ²*Dept. of Biomedical Engineering, Northwestern Univ., Chicago, USA.* ³*Dept. of Physical Med & Rehab., Northwestern Univ., Chicago, USA*

T52: Brain Source Analysis of Motor Planning for Initiating Stepping in Individuals with Subacute Stroke: A case series

Sue Peters¹, S. Jayne Garland², Bimal Lakhani¹, Anthony Herdman¹, Lara Boyd¹

¹*Univ. of British Columbia, Vancouver, Can..* ²*Western Univ., London, Can.*

T53: Paired Associative Stimulation as a Tool to Assess Plasticity Enhancers in Chronic Stroke

Joshua Silverstein¹, Mar Cortes¹, Katherine Tsagaris¹, Alejandra Climent^{1,2}, Linda Gerber³, Clara Oromendia³, Pasquale Fonzetti^{4,3}, Rajiv Ratan^{3,1}, Tomoko Kitago^{1,3}, Marco Iacoboni^{5,6}, Allan Wu^{6,7}, Bruce Dobkin^{8,9}, Dylan Edwards^{3,1}

¹Burke Neurological Inst., White Plains, USA. ²Sant Joan de Deu Hospital, Barcelona, Spain. ³Weill Cornell Medical College, New York, USA. ⁴Burke Rehabilitation Hospital, White Plains, USA. ⁵UCLA Semel Inst. for Neuroscience and Human Behavior, Los Angeles, USA. ⁶Ahmanson-Lovelace Brain Mapping Center, Los Angeles, USA. ⁷Univ. of California, Los Angeles, USA. ⁸Geffen School of Medicine, Los Angeles, USA. ⁹Reed Neurologic Research Center, Los Angeles, USA

T54: Severity of Impairment is Important When Exploring Biomarkers of Upper Limb Outcome Post-Stroke

* Fletcher H. McDowell Award Finalist

Kate Hayward^{1,2}, Jennifer Ferris², Keith Lohse³, Michael Borich⁴, Steve Cramer⁵, Alexandra Borstad^{6,7}, Jill Stewart⁸, Sean Dukelow⁹, Jessica Cassidy⁵, Sonja Findlater⁹, Jason Neva², Lara Boyd²

¹Florey Inst. of Neuroscience and Mental Health, Melbourne, Australia. ²Univ. of British Columbia, Vancouver, Can. ³Univ. of Utah, Salt Lake City, USA. ⁴Emory Univ., Atlanta, USA. ⁵Univ. of California, Irvine, USA. ⁶College of St. Scholastica, Duluth, USA. ⁷Ohio State Univ., Columbus, USA. ⁸Univ. of South Carolina, Columbia, USA. ⁹Univ. of Calgary, Calgary, Can.

T55: The Importance of Edinburgh Handedness Inventory Short Form to Determine Handedness in Seventeen Indonesian Stroke Patients - A case series

Widjajalaksmi Kusumaningsih, Herry Hong

Dept. of Physical Medicine and Rehabilitation, Faculty of Medicine, Univ. of Indonesia, Ciptomangunkusumo Hospital, Jakarta, Indonesia

POSTER SESSION II

FRIDAY, NOVEMBER 2 • 10:30 - 12:30 PM • AQUA BALLROOM ABC

F1: How Anticipatory Postural Adjustments Affect Protective Steps: A step-by-step multi-level analysis

Daniel Peterson¹, Keith Lohse², Martina Mancini³

¹Arizona State Univ., Tempe, AZ, USA. ²Univ. of Utah, Salt Lake City, UT, USA. ³Oregon Health Sciences Univ., Portland, OR, USA

F2: Asymmetric Hindlimb Posture and Withdraw Reflexes Induced by Unilateral Brain Injury are Encoded in Spinal Cord

Mengliang Zhang¹, Hiroyuki Watanabe², Daniil Sarkisyan², Jonas Thelin³, Jens Schouenborg³, Georgy Bakalkin²

¹Dept. of Molecular Medicine, Univ. of Southern Denmark, Odense, Denmark. ²Dept. of Pharmaceutical Biosciences, Uppsala Univ., Uppsala, Sweden. ³Neuronano Research Center, Dept. of Experimental Medical Science, Lund Univ., Lund, Sweden

F3: Assessing Task Execution Abilities for Communication of Patients with Unresponsive Wakefulness Syndrome Using a Vibro-Tactile P300 Brain-computer Interface

Christoph Guger^{1,2}, Rossella Spataro³, Katrin Mayr¹, Günter Edlinger^{1,2}

¹Guger Technologies OG, Graz, Austria. ²g.tec medical engineering GmbH, Schiedlberg, Austria. ³ALS Clinical Research Center, BioNeC, Univ. of Palermo, Palermo, Italy

F4: Treatment Frequency for Long-Term Efficacy of AbobotulinumtoxinA Injections: A phase 3 study in patients with upper limb spasticity following stroke or traumatic brain injury

Jean-Michel Gracies¹, Allison Brashear², Svetlana Khatkova³, Brian Carlson⁴, Anne-Sophie Grandoulier⁵, Philippe Picaut⁵

¹EA 7377 BIOTN, Université Paris-Est, Hospital Albert Chenevier-Henri Mondor, Service de Rééducation Neurolocomotrice, Créteil, France. ²Wake Forest School of Medicine, Winston-Salem, USA. ³Center of Ministry of Health and Social Development of Russian Federation, Moscow, Russian Federation. ⁴Ipsen Biopharmaceuticals, Basking Ridge, USA. ⁵Ipsen Pharma, Les Ulis, France

F5: Effect of the Gait Imagery Related Supplementary Motor Area Facilitation Using Functional Near Infrared Spectroscopy Mediated Neurofeedback on Post Stroke Balance and Upper Limb Function

Masahito Mihara^{1,2}, Hiroaki Fujimoto^{3,2}, Hironori Otomune^{3,2}, Noriaki Hattori^{2,3}, Yoshiyuki Watanabe², Teiji Kawano³, Megumi Hatakenaka³, Hajime Yagura³, Ichiro Miyai³, Hideki Mochizuki²

¹Kawaqasaki Medical School, Kurashiki, Japan. ²Osaka University Graduate School of Medicine, Suita, Japan. ³Morinomiya Hospital, Osaka, Japan

F6: Transcranial Direct Current Stimulation Effects on Cerebral Blood Flow and Motor Learning

Anant Shinde^{1,2}, Fanny Munsch^{2,1}, David Alsop^{2,1}, Gottfried Schlaug^{2,1}

¹Harvard Medical School, Boston, USA. ²Beth Israel Deaconess Medical Center, Boston, USA

Abstract titles are printed as submitted by the author. Full abstracts can be found at www.asnr.com

F7: Towards Real-Time Prediction of Freezing of Gait in Parkinson's Disease Using Spectral and Temporal Features from Acceleration of Lower-Body Segments

Nader Naghavi, Eric Wade

Univ. of Tennessee, Knoxville, Knoxville, USA

F8: Increased Resting Motor Network Connectivity is Associated with Positive Outcomes in Chronic Stroke

Daniel Lench, Akash Mishra, Colleen Hanlon

Medical Univ. of SC, Charleston, USA

F9: Predictors of Recovery from Acute Aphasia

Julius Kernbach¹, Andrea Norton², Karen Chenausky³, Sarah Marchina¹, Gottfried Schlaug¹

¹Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, USA. ²Beth Israel Deaconess Medical Center, Boston, USA. ³Boston Univ., Boston, USA

F10: Clinical Translation of Early Clinical and Neuroimaging Biomarkers to Predict Upper Extremity Stroke Motor Recovery

David Lin¹, Alison Cloutier¹, Samuel Snider¹, Fabio Giatsidis¹, Jessica Ranford¹, Kristin Parlman¹, Susan Fasoli², Teresa Kimberley², Steven Cramer³, Seth Finklestein¹, Leigh Hochberg¹

¹Massachusetts General Hospital, Boston, USA. ²MGH Inst. of Health Professions, Boston, USA. ³Univ. of California Irvine, Irvine, USA

F11: Grey Matter Hypertrophy in the Right Hemisphere Explains Variance in Speech-Motor Outcomes in Chronic Aphasia

Sebastien Paquette, Andrea Norton, Gottfried Schlaug

Beth Israel Deaconess Medical Center / Harvard Medical School, Boston, USA

F12: Differential Effects of Low-Frequency rTMS on Cortical Excitability and Inhibition in Aged Healthy Participants

Lauren Edwards¹, Miles Wischniewski¹, Deborah Barany¹, Isabelle Vernon¹, Daniel Drake², Gerry Hobbs³, Cathrin Buetefisch¹

¹Emory Univ., Atlanta, USA. ²Columbia Univ., New York, USA. ³West Virginia Univ., Morgantown

F13: A Novel Method for Quantifying Interlimb Coordination in Persons with Hemiparesis Post-Stroke

**2016 Clinical Research Network (CRN) Grant Recipient*

Susan Duff¹, Aaron Miller², Lori Quinn³, Lauri Bishop³, Gregory Youdan³, Heather Ruthrauff⁴, Eric Wade²

¹Chapman Univ., Irvine, USA. ²Univ. of Tennessee, Knoxville, USA. ³Teachers College, Columbia Univ., New York, USA. ⁴Children's Hospital of Philadelphia, Philadelphia, USA

F14: Proprioception After Stroke - Examining Diffusion Properties in Sensory and Motor Pathways

** Fletcher H. McDowell Award Finalist*

Sonja Findlater, Erin Mazzerole, G. Bruce Pike, Sean Dukelow
Univ. of Calgary, Calgary, Canada

F15: Alterations in Cortical Excitability and Motor Skill Practice Following a 3-Month Aerobic Exercise Program in Individuals with Parkinson's Disease

Jason Neva¹, Bimal Lakhani¹, Matthew Sacheli², Nicole Nielson², Jassamyn McKenzie², A. Jonathan Stoessl², Lara Boyd¹

¹Univ. of British Columbia, Vancouver, Can. ²Parkinson's Research Ctr., Vancouver, Can.

F16: Effects of Different Transcranial Direct Current Stimulation Devices on Motor Cortical Excitability

Aviroop Dutt-Mazumder, Scott Brown, Aastha Dharia, Amanda Vogel, Reesha Talati, Adam Gardi, Chandramouli Krishnan

Univ. of Michigan, Ann Arbor, USA

F17: The Potential of Exercise Combined with an Exercise Mimetic Drug to Promote Functional Recovery Following Hindlimb Stroke

*Presidential Award Finalist

Matthew McDonald^{1,2}, Anthony Carter², Angela Dykes^{1,2}, Matthew Jeffers^{1,2}, Florance Franko¹, Baptiste Lacoste^{1,2,3}, Dale Corbett^{1,2}

¹Univ. of Ottawa, Ottawa, Canada. ²Canadian Partnership for Stroke Recovery, Ottawa, Canada. ³Ottawa Hospital Research Inst., Ottawa, Canada

F18: Proportional Recovery: How it Arises and Implications for Stroke Rehabilitation

Merav Rachel Senesh, David J. Reinkensmeyer

Univ. of California Irvine, Irvine, USA

F19: Cortical-cerebellar Excitability Changes During Visuomotor Adaptation in Individuals with Middle Cerebral Artery (MCA) Stroke and Healthy Older Individuals

Samantha Feldman¹, Katlyn Brown², Julia Schmidt^{3,1}, Jennifer Ma¹, Jason Neva¹, Lara Boyd¹

¹Univ. of British Columbia, Vancouver, Canada. ²Univ. College London, London, ^{UK}. ³La Trobe Univ., Melbourne, Australia

F20: Using Exploratory Learning to Encourage Selective Hip-Knee Joint Movement in Infants Born Full-Term and Preterm

Jeongah Kim, Barbara Sargent, Linda Fetters

Univ. of Southern California, Los Angeles, USA

F21: A Mouse Model of Perinatal Stroke That Produces Targeted Injury in Sensorimotor Cortex and Contralateral Impairments in Forelimb Function

Isabelle Takoff, Mariana Gomez-Smith, Julian Pitney, Greg Silasi

Univ. of Ottawa, Ottawa, Canada

F22: Neural Correlate of Movement Proficiency in Infants Learning Prone Locomotion

Thubi H. A. Kolobe¹, Andrew H. Fagg², David P. Miller², Lei Ding²

¹Univ. of Oklahoma Health Sciences Center, Oklahoma City, USA. ²Univ. of Oklahoma, Norman, USA

F23: Exploring the Relationship Between Impaired Motor Coordination During Walking and Damage to Motor Pathways Following Stroke

Shraddha Srivastava¹, Bryant Seamon^{1,2}, Joshua Teves¹, Mark Bowden^{1,2}, Chris Gregory^{1,2}, Colleen Hanlon¹, Leonardo Bonilha¹, Truman Brown¹, Rick Neptune³, Steven Kautz^{1,2}
¹Medical Univ. of South Carolina, Charleston, USA. ²Ralph H. Johnson VA Medical Center, Charleston, USA. ³The Univ. of Texas, Austin, USA

F24: Acoustic Stimulation During a Daytime Nap to Enhance Sensorimotor Skill Performance in Older Adults With and Without a History of Stroke

Brian Johnson, Kelly Westlake
Univ. of Maryland School of Medicine, Dept. of Physical Therapy & Rehabilitation Science, Baltimore, USA

F25: Functional Neuroimaging Predicts Motor Recovery in Early Stroke Rehabilitation

Jessica M. Cassidy, Kiranjot Kaur, Ashley K. Masuda, Ramesh Srinivasan, Steven C. Cramer
Univ. of California, Irvine, Irvine, USA

F26: Chronic Stroke and Force: A Novel Assessment Tool

Berkenesh Gebrekristos¹, Daniel Neumaier², Adelyn Tu-Chan¹, Karunesh Ganguly¹
¹Univ. of California, San Francisco, San Francisco, USA. ²California State Univ., Maritime Academy, Vallejo, USA

F27: Severity-specific Brain Stimulation for Promoting Paretic Upper Limb Motor Function in Chronic Stroke Patients

Yin-Liang Lin¹, Kelsey Potter-Baker^{1,2}, Vishwanath Sankarasubramanian³, David Cunningham^{4,5,2}, Adriana Conforto⁶, Nicole Varnerin¹, Xiaofeng Wang¹, Ken Sakaie¹, Jayme Knutson^{4,7}, Andre Machado¹, Ela Plow¹
¹Cleveland Clinic, Cleveland, USA. ²Louis Stokes Cleveland Dept. of Veteran's Affairs, Cleveland, USA. ³Univ. of Michigan, Ann Arbor, USA. ⁴Case Western Reserve Univ., Cleveland, USA. ⁵MetroHealth Medical Center, Cleveland, USA. ⁶Sao Paulo Univ., Sao Paulo, Brazil. ⁷MetroHealth Rehabilitation Inst., Cleveland, USA

F28: Assessing the Clinical- and Laboratory-based Criterion Validity of Four Methods for Flexion Synergy Quantification

Grace C. Bellinger, Michael D. Ellis
Northwestern Univ., Chicago, IL, USA

F29: Patterns of Behavioural Impairment and Recovery Differ Based on Regionalization of Cortical Infarcts in Rats

Matthew Jeffers^{1,2}, Gillian Lahey³, Boris Touvykine⁴, Numa Dancause⁴, Dale Corbett^{1,2}
¹Univ. of Ottawa, Ottawa, Canada. ²Canadian Partnership for Stroke Recovery, Ottawa, Canada. ³Carleton Univ., Ottawa, Canada. ⁴Université de Montréal, Montréal, Canada

F30: Using Multi-channel Visual Feedback to Learn a New Walking Pattern

Kevin Day^{1,2}, Amy Bastian^{1,2}
*Presidential Award Finalist
¹Johns Hopkins Medical Inst., Baltimore, USA. ²Kennedy Krieger Inst., Baltimore, USA

F31: Evidence of Altered Interhemispheric Communication in Paediatric Mild Traumatic Brain Injury

Julia Schmidt^{1,2}, Katlyn E. Brown^{3,4}, Samantha J. Feldman⁵, Shelina Babul^{6,7,8}, Jill G. Zwicker^{6,9,10}, Lara A. Boyd^{2,8}

¹Dept. of Occupational Therapy, La Trobe Univ., Melbourne, Australia. ²Dept. of Physical Therapy, Univ. of British Columbia, Vancouver, Can. ³Sobell Dept. of Motor Neuroscience and Movement Disorders, Univ. College London, London, UK. ⁴Graduate Program in Rehabilitation Sciences, Univ. of British Columbia, Vancouver, Can. ⁵Graduate Program in Neuroscience, Univ. of British Columbia, Vancouver, Can. ⁶Dept. of Pediatrics, Univ. of British Columbia, Vancouver, Can. ⁷BC Children's Hospital, Vancouver, Can. ⁸Djavad Mowafaghian Centre for Brain Health, Univ. of British Columbia, Vancouver, Can. ⁹BC Children's Hospital Research Inst., Vancouver, Can. ¹⁰Dept. of Occupational Science & Occupational Therapy, Univ. of British Columbia, Vancouver, Can.

F32: Does Matching Task-challenge to Patient-ability during Stroke Rehabilitation Promote Greater Post-Stroke Arm Motor Recovery Than Usual Care? The MATCHING Task CHallenge (MATCH) Trial

Michelle Woodbury, Scott Hutchison, Christian Finetto, Andrew Fortune, Kelly Anderson, Abigail Lauer-Kelly, Viswanathan Ramakrishnan
Medical Univ. of South Carolina, Charleston SC, USA

F33: Dual-tasking during Initial Learning Interferes with Savings of a Novel Walking Pattern

Kristan Leech^{1,2}, Amy Bastian^{1,2}

¹Kennedy Krieger Inst., Baltimore, USA. ²Johns Hopkins Univ., Baltimore, USA

F34: A Preliminary Study on Fatigue Severity Scale in Subacute and Chronic Post Stroke Patients Using Two Minute Walking Test: The Indonesian Experience

Widjajalaksmi Kusumaningsih, Teinny Suryadi

Dept. of Physical Medicine and Rehabilitation, Faculty of Medicine, Univ. of Indonesia, Ciptomangunkusumo Hospital, Jakarta, Indonesia

F35: Neuroplasticity Following Interlimb Training with a Prosthesis Simulator in Intact Participants

Bennett Alterman, Shuo Wang, James Kling, Lewis Wheaton
Georgia Inst. of Technology, Atlanta, USA

F36: MoTaStim-Foot, a Randomized, Single-blinded, Mixed-methods, Feasibility Study Exploring Sensory Stimulation of the Foot and Ankle Early Post-stroke

Alison M. Aries¹, Valerie M. Pomeroy², Julius Sim¹, Sue Read¹, Susan M. Hunter¹

¹Faculty of Medicine and Health Sciences, Keele Univ., Keele, Staffordshire, UK.

²Acquired Brain Injury Rehabilitation Alliance (ABIRA), School of Health Sciences, Univ. of East Anglia, Norwich, UK

F37: Using a Novel Lever-drive Wheelchair to Increase Arm Movement Practice Early After Stroke: Preliminary Results of a Randomized Controlled Trial

Joan Lobo Prat¹, Daniel K. Zondervan², Christopher Lew¹, Brendan W. Smith³, Vicki Chan¹, Cathy Chou¹, Susan Shaw⁴, David J. Reinkensmeyer¹, Steven C. Cramer¹

¹Univ. of California, Irvine, Irvine, USA. ²Flint Rehabilitation Devices, LLC, Irvine, USA. ³Loyola Marymount Univ., Los Angeles, USA. ⁴Rancho Los Amigos National Rehabilitation Center, Downey, USA

F38: Using the Manometer for Continuous Feedback on Hand Activity After Stroke: Preliminary Results

Diogo S. de Lucena^{1,2}, Justin B. Rowe³, Vicky Chan¹, Steven C. Cramer¹, David J. Reinkensmeyer¹

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F39: A Novel Method of Producing Asymmetric Propulsive-force Generation During Walking Using Differential Fore-aft Resistance in Nonimpaired Individuals

Avantika Naidu, David Brown

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F40: Generalizability of Muscle Synergies During Static and Dynamic Motor Tasks in the Arm Workspace of Stroke Survivors

Christopher Taylor, Lei Ma, Manuel Portilla-Jiménez, Jinsook Roh

Temple Univ., Philadelphia, USA

F41: Influence of Descending Cortical Projections on Spinal Reflex Excitability in Post-stroke Individuals

Alejandro Lopez, Jiang Xu, Steven Eicholtz, Michael Borich, Trisha Kesar

Emory Univ., Atlanta, USA

F42: Predicting Recovery of Upper Limb Function 6 Months after Middle Cerebral Artery Infarction Using Diffusion Tensor Imaging

Doo Young Kim¹, Junsoo Noh², Woo-Suk Tae^{3,2}, Yu Mi Hwang³, Yoonhye Na^{3,2}, Sung Bom Pyun^{2,3}

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Niveditha Muthukrishnan, Daniel S. Peterson

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F44: Effects of Visual Feedback on the Coordination of Pointing with a Prosthesis

Daniela Junckes da Silva Mattos, Scott Frey

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F45: Prediction of Aphasia Severity in Early and Later Subacute Phase of Stroke

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F46: Leveraging Visual Search Patterns in the Trail-Making Task to Understand Cognitive Impairments in Stroke Patients

Christopher Perry, Adam Harrison, Troy Herter

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F47: Non-Paretic Hand Exercise to Task-Failure Increases Functional Connectivity to Paretic Hand in Chronic StrokeQian Ding^{1,2}, Theresa McGuirk^{1,2}, Elliott Perry^{1,2},Carolynn Patten^{1,2}¹Biomechanics, Rehabilitation, and Integrative Neuroscience (BRaIN) Lab, Univ. of California, Davis School of Medicine, Davis, USA. ²Northern California VA Healthcare System, Davis, USA**F48: Targeted Neuromodulation of Interhemispheric Connectivity after Stroke**Shiyu Lin, Jacqueline Palmer, Michael Borich

Emory Univ., Atlanta, USA

F49: Backward Locomotor Treadmill Training Combined with Transcutaneous Spinal Direct Current Stimulation (tsDCS) in Stroke: A Pilot Feasibility and Safety StudyOluwole Awosika¹, Saira Matthews², Emily Staggs¹, Christina Zhang¹, Nirguna Thalla¹,Rohitha Moudgal¹, Pierce Boyne³, Kari Dunning³, Daniel Woo¹, Brett Kissela¹¹Univ. of Cincinnati College of Medicine, Cincinnati, USA. ²Univ. of Cincinnati, Cincinnati, USA. ³Univ. of Cincinnati College of Allied Health Sciences, Cincinnati, USA**F50: A Novel EMG-based Robotic Control for Restoring Normal Synergies after Stroke**Thomas Augenstein, Edward Washabaugh, Christian Remy, Chandramouli Krishnan

Univ. of Michigan, Ann Arbor, USA

F51: Validity of Subjective Sleep Inventories for Assessment of Sleepiness in Inpatient Rehabilitation for StrokeHeather Johns¹, Elaina Cummer², Ellie Flack³, Sarah Neveux³, Elena Skorniyakov³, Douglas Weeks⁴¹Univ. of Washington, Seattle, USA. ²Wake Forest Univ., Winston-Salem, USA. ³Eastern Washington Univ., Spokane, USA. ⁴St. Luke's Rehabilitation Inst., Spokane, USA**F52: Interventions to Augment Upper Extremity Motor Improvement in Individuals with a Traumatic Brain Injury - A Systematic Review**Sandeep Subramanian, Melinda Fountain, Ashley Hood

Dept. of Physical Therapy, UT Health San Antonio, San Antonio, USA

F53: Does Haptic Feedback Support Motor Learning with a Prosthesis? A Neurobehavioral EvaluationJohn Johnson, Lewis Wheaton

Georgia Inst. of Technology, Atlanta, USA

F54: Development of an Electromyographically-controlled Virtual Arm for Post-stroke Motor RehabilitationMingjian Zhang¹, Reza Rawassizadeh², Ehsan Hoque², Ania Busza¹¹Dept. of Neurology, Univ. of Rochester Medical Center, Strong Memorial Hospital, Rochester, USA. ²Dept. of Computer Science, Univ. of Rochester, Rochester, USA

F55: Assessment of Reflex and Nonreflex Components of Spasticity in Cerebral Palsy

Dali Xu¹, Yi-Ning Wu², Yupeng Ren³, Deborah Gaebler-Spira⁴, Fan Gao⁵, Mauricio Delgado⁶, Li-Qun Zhang^{7,1}

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F56: Effects of Gait Training on Spinal Excitability and Gait Biomechanics in Individuals Post-stroke

Jiang Xu, Steven Eicholtz, Justin Liu, Morgan Trees, Alejandro Lopez, Trisha Kesar
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g.tec neurotechnology GmbH

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California Rehabilitation Institute

(Booth 3)

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The National Center of Neuromodulation for Rehabilitation

(Booth 4)

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(Booth 5)

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APDM Wearable Technologies

(Booth 6)

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(Booth 7)

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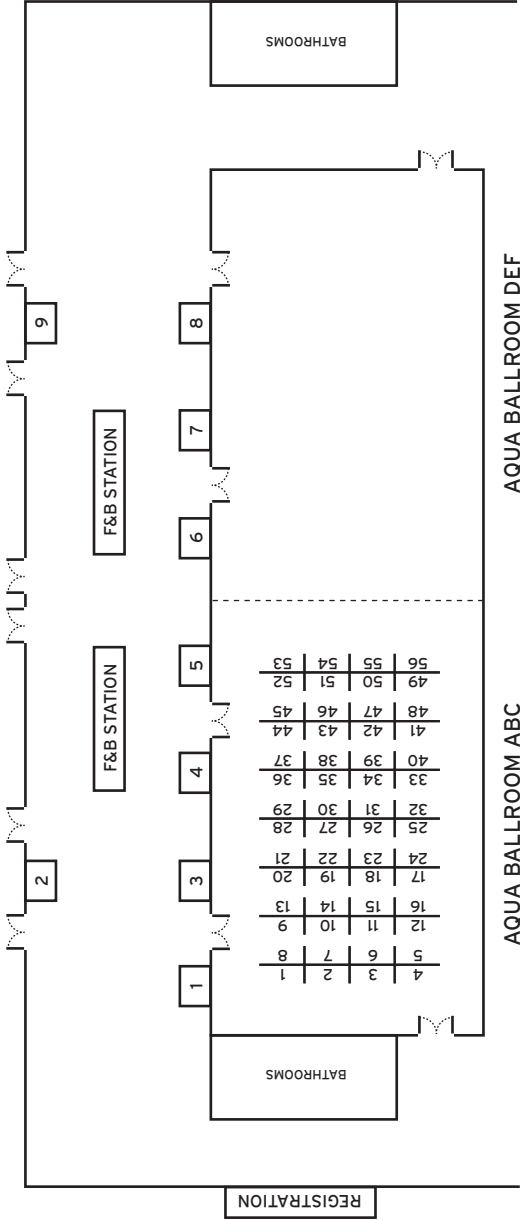
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