Objectives
Identify gaps and opportunities to advance stroke recovery research through bi-directional translation between basic biomedical research and clinical science and practice. The goal of these discussions is to shape the best path forward for developing effective therapies for stroke recovery and rehabilitation.

- The workshop deliverable will be in the form of a white paper that describes what is needed to achieve key advances in the field, and will serve to:
  - Define what work is needed to achieve successful translation of restorative therapies from bench to clinic.
  - Establish an effective guidepost for future stroke recovery and rehabilitation research

Day 1 – Tuesday, November 27, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30-8:30 AM</td>
<td>Registration</td>
</tr>
<tr>
<td>8:30-8:35 AM</td>
<td>Welcome Address</td>
</tr>
<tr>
<td></td>
<td>Walter Koroshetz MD, Director, National Institute of Neurological Disorders and Stroke</td>
</tr>
<tr>
<td>8:35-8:50 AM</td>
<td>Purpose of Workshop</td>
</tr>
<tr>
<td></td>
<td>Scott Janis, PhD, Program Director, Division of Clinical Research, National Institute of Neurological Disorders and Stroke</td>
</tr>
<tr>
<td>8:50-9:00 AM</td>
<td>Charge from the Workshop Co-Chairs</td>
</tr>
<tr>
<td></td>
<td>Tom Carmichael, MD, PhD, Chair and Professor of Neurology, University of California, Los Angeles</td>
</tr>
<tr>
<td></td>
<td>Steve Cramer, MD, Professor of Neurology, University of California, Irvine</td>
</tr>
</tbody>
</table>
9:00-9:15 AM  Opening Keynote Address:  What is the current state of modern stroke Rehabilitation practice?

Robert Teasell, MD, FRCPC, Research Director and a Professor in the Department of Physical Medicine & Rehabilitation at the Schulich School of Medicine & Dentistry, Western University; Medical Director of the Stroke Rehabilitation Program at Parkwood Institute, St. Joseph’s Health Care London, ON Canada

9:15-10:15 AM  Panel Discussion:  How do we address spontaneous recovery (i.e., especially restitution vs. compensation of function) in modeling data from pre-clinical studies to clinical trials?  Moderator: Steve Cramer, MD

Discuss how we can consider clinical co-morbidities in translational research and consistently define recovery and rehabilitation across species.

- Bruce Dobkin, MD, Professor of Neurology, University of California, Los Angeles
- Advie Ergul, MD, PhD, Professor of Medicine, Medical University of South Carolina
- Theresa Jones, PhD, Professor of Psychology, University of Texas at Austin
- Randy Nudo, PhD, Professor of Rehabilitation Medicine, University of Kansas
- Gottfried Schlaug, MD, PhD, Associate Professor of Neurology, Harvard Medical School

10:15-10:35 AM  BREAK

10:35-11:45 AM  Panel Discussion:  What is the current state of recovery/rehabilitation research in stroke? What are our knowledge gaps in aligning animal and human models of stroke recovery?  Moderator: Tom Carmichael, MD, PhD

Discuss the current landscape and gaps between clinical knowledge and animal models, including how we define the acute and chronic recovery periods (i.e., in-hospital and post-hospital care) across species and recovery of other non-motor modalities, such as aphasia, cognition, etc.

- Laurel Buxbaum, PsyD, Research Professor of Rehabilitation Medicine, Thomas Jefferson University
- Sunghee Cho, PhD, Professor of Neuroscience, Weill Cornell Medicine/Burke Neurological Institute
- Julius Fridriksson, PhD, Professor of Communication Sciences and Disorders, University of South Carolina
- John Krakauer, MD, MA, Professor of Neurology, Johns Hopkins University
- Sean Savitz, MD, Professor of Neurology, University of Texas, Houston
- Steven Zeiler, MD, PhD, Assistant Professor of Neurology, Johns Hopkins University

11:45 - 1:00 PM  LUNCH

1:00-5:00 PM  Short Panel Discussions:  Identifying clearly defined research opportunities across several recurring themes for translational research in stroke recovery

Moderators: Steve Cramer, MD & Tom Carmichael, MD, PhD

Each panel will:
1. Address the gaps, questions, data missing, etc. that are needed to advance research.
2. Propose actionable translational opportunities to successfully advance promising interventional approaches from the laboratory to clinical testing.

1:00-1:50 PM Animal Models - Considering the limitations, how we can use animal models to address clinical gaps, better understand the molecular mechanisms of recovery, and exploit potential new targets to enhance spontaneous recovery?
Facilitator: Francesca Bosetti, PhD, NINDS

- Sunghee Cho, PhD, Professor of Neuroscience, Weill Cornell Medicine/Burke Neurological Institute
- Dale Corbett, PhD, Professor of Neurosciences in the Department of Cellular and Molecular Medicine, University of Ottawa
- Karunesh Ganguly, MD, PhD, Associate Professor of Neurology, University of California, San Francisco
- Seth Hayes, PhD, Assistant Professor of Bioengineering, University of Texas at Dallas
- Jin-Moo Lee, MD, PhD, Professor of Neurology, Washington University
- Randy Nudo, PhD, Professor of Rehabilitation Medicine, University of Kansas Medical Center
- Sean Savitz, MD, Professor of Neurology, University of Texas, Houston

1:50-2:40 PM Endpoints and Prognostication – How do we align clinical and preclinical patient-relevant outcomes and address what is meant when we say a person will benefit and what is needed to develop initial triage step at the time of discharge?
Facilitator: Sue Marden, PhD, RN, NCMRR

- Kyra Becker, MD, Professor of Neurology, University of Washington
- Alex Carter, MD, PhD, Associate Professor of Neurology, Division of Rehabilitation, Washington University
- Pam Duncan, PhD, Professor of Neurology and Gerontology and Geriatric Medicine, Wake Forest University
- Theresa Jones, PhD, Professor of Psychology, University of Texas at Austin
- Tomoko Kitago, MD, Assistant Professor of Neurology, Burke Neurological Institute
- Deborah Levine, MD, MPH, Associate Professor of Medicine and Neurology, University of Michigan
- Nicolas Schweighofer, MS, PhD, Associate Professor of Biokinesiology and Physical Therapy, University of Southern California
- Carolee Weinstein, PhD, PT, FAPTA, Professor of Biokinesiology and Physical Therapy, University of Southern California

2:40-3:00 PM BREAK

3:00-3:50 PM Modulator and co-variate factors in recovery – How do we use translational models to inform and address dosing and timing of interventions?
Facilitator: Daofen Chen, PhD, NINDS

- Alex Dromerick, MD, Professor of Rehabilitation Medicine and Neurology, Georgetown University
- Dorothy Farrar Edwards, PhD, PT, Professor of Psychology, University of Wisconsin-Madison
3:50-4:40 PM  **Biomarkers** – How do we identify markers that cross the translational bridge?
**Facilitator: Jim Koenig, PhD, NINDS**

- Marion Buckwalter, MD, PhD, *Associate Professor of Neurology and Neurosurgery, Stanford University*
- Alex Carter, MD, PhD, *Associate Professor of Neurology, Division of Rehabilitation, Washington University*
- Mitch Elkind, MD, *Professor of Neurology and Epidemiology, Columbia University*
- Jason Hinman, MD, PhD, *Assistant Professor of Neurology, University of California, Los Angeles*
- Randy Marshall, MD, *Professor of Neurology, Columbia University*
- Gottfried Schlaug, MD, PhD, *Associate Professor of Neurology, Harvard Medical School*
- Larry Wechsler, MD, *Professor of Neurology, University of Pittsburgh*

4:40-5:00 PM  **Day 1 wrap-up, Announcements and Day 2 plans**

**Steve Cramer, MD, Meeting co-chair**
**Tom Carmichael, MD, PhD, Meeting co-chair**
**Scott Janis, PhD, NINDS**

5:00 PM  **Adjourn for the day**

**Day 2 – Wednesday, November 28, 2018**

8:30-9:00 AM  **Review and Summary of Day 1**
**Tom Carmichael, MD, PhD, Meeting co-chair**

9:00-10:30 AM  **Open discussion of key conclusions**
**Steve Cramer, MD, Meeting co-chair**

10:30-11:00 AM  **Wrap-up and Next Steps**
**Scott Janis, PhD, NINDS**

11:00-12:30 AM  **LUNCH on your own**

12:30-3:30 PM  **Open round-table discussion of practical issues focused on generating transformative ideas for operation or implementation of stroke rehabilitation trials in StrokeNet**
12:30-1:45 PM  Are we missing opportunities to develop interventions for problems or symptoms in early phase recovery that are especially important to patients and community practitioners? Review of pre-workshop survey results.

- Scott Janis, PhD, Program Director, Division of Clinical Research, National Institute of Neurological Disorders and Stroke, NIH – Roundtable Chair
- Kyra Becker, MD, Professor of Neurology, University of Washington
- Steve Cramer, MD, Professor of Neurology, University of California, Irvine
- Pam Duncan, PhD, Professor of Neurology and Gerontology and Geriatric Medicine, Wake Forest University
- Stephanie Mohl, Vice President, American Heart Association/American Stroke Association
- Carolee Winstein, PhD, PT, FAPTA, Professor of Biokinesiology and Physical Therapy, University of Southern California

1:45-2:35 PM  How can rehabilitation trials better understand and collaborate with the community partners who are providing outpatient services and are affiliated with StrokeNet? Is there a role to work with professional organizations?

- Alison Cernich, PhD, Director, National Center for Medical Rehabilitation Research/National Institute of Child Health and Human Development, NIH – Roundtable Chair
- Robyn Ellerbee-Watson, PhD, MPH, Director of Research, American Physical Therapy Association
- Bruce Gans MD, Vice President and Chief Medical Officer, Kessler Institute for Rehabilitation
- Catherine Meyers, MD, Director – Office of Clinical and Regulatory Affairs, National Center for Complementary and Integrative Health

2:35-3:30 PM  Are pragmatic, simple or adaptive trials feasible for stroke recovery and rehabilitation? How can the Network be leveraged to support such trials? Are there big data approaches that can be used to power trials in StrokeNet?

- Daofen Chen, PhD, Program Director, Systems and Cognitive Neuroscience, National Institute of Neurological Disorders and Stroke, NIH – Roundtable Chair
- Julie Burnhardt, PhD, Clinical Head of the Stroke Division at the Florey Institute of Neuroscience and Mental Health, University of Melbourne
- Gary Cutter, PhD, Professor of Biostatistics, University of Alabama
- Maarten Lansberg, MD, Associate Professor of Neurology, Stanford University
- Sook-Lei Liew, PhD, OTR/L, Assistant Professor of Biokinesiology and Physical Therapy, University of Southern California
- Yuko Palesch, PhD, Professor of Public Health Sciences, Medical University of South Carolina

3:30 PM  Meeting Adjourns