UNIVERSITY OF LOUISVILLE

KOSAIR CHARITIES CENTER FOR PEDIATRIC NEURORECOVERY

UNIVERSITY OF LOUISVILLE

KENTUCKY SPINAL CORD INJURY RESEARCH CENTER

Pediatric NeuroRecovery Summit 2019

Thursday, May 16 & Friday, May 17

University of Louisville

Frazier Rehab Institute

Supported by

Kosair Charities

and

Kentucky Spinal Cord Injury Research Center

Welcome to the Pediatric NeuroRecovery Summit – 2019

Our intent is to bring together healthcare professionals, researchers, and administrators as a community with a common interest and commitment to advancing neurorecovery and acquisition in children and adolescents with neurological disorders and positively enhancing the quality of life of children and their families.

The Pediatric NeuroRecovery Summit – 2019 is co-supported by two organizations: First, the Kosair Charities Center for Pediatric NeuroRecovery was launched in 2014 at the University of Louisville through the support of Kosair Charities providing $7.3 million for the next 7 years. Our mission as a Center is three-fold, to:

- Deliver state-of-the-art recovery-based therapies to children with paralysis
- Conduct ground-breaking research to improve treatments and recovery outcomes
- Train pediatric clinicians and researchers in a recovery-based approach to rehabilitation

When we first envisioned this center nearly 7 years ago and its mission, we envisioned hosting and developing such a summit, specifically dedicated to advancing neurorecovery in children. We held the first Summit in 2017 coalescing local partnerships among physicians, therapists, researchers, and supporters to advance a programmatic mission of research and clinical practice. This year, we have expanded the Summit, inviting clinicians, researchers, and administrators from across the United States. We are honored that you made your attendance a priority and look forward to our sharing and dialogue with the aim of informing one another, developing collaborations and networking that is solely focused on advancing neurorecovery.

Second, the Pediatric NeuroRecovery Summit is supported by the Kentucky Spinal Cord Injury Research Center (KSCIRC). While first dedicated to developing successful spinal cord repair strategies that can be taken from the laboratory to the clinic in a timely and responsible fashion, the KSCIRC has expanded to a mission of basic and translational science in the human condition after SCI. The breadth of human research spans from pediatrics to adults, following individuals across the lifespan, while fast-tracking evidence into clinical practice advancing neurorecovery at Frazier Rehab Institute.

Thank you again for coming together for the Pediatric NeuroRecovery Summit – 2019. We have been looking forward to your arrival and to our time together.

Andrea L. Behrman, PhD, PT, FAPTA

WELCOME

OVERVIEW

The purpose of the **Pediatric NeuroRecovery Summit 2019** is to bring together a community of scientists and clinicians with a common mission and vision to:

- advance scientific evidence capitalizing on understanding of neuroplasticity and activity-dependent plasticity in the developing child and adolescent with neurologic injury/disease
- propel that knowledge into the development and testing of neurotherapeutic interventions to restore and achieve novel, neurophysiological outcomes and capacity
- translate such interventions effectively into clinical practice promoting health, function, and quality of life.

While many options exist in the clinician's *toolbox* and are applied to improve function and participation, a neurotherapeutic approach has the inherent element of changing the intrinsic neuromuscular or physiological capacity of a child to improve health, function, participation, and quality of life. The Pediatric NeuroRecovery Summit is a unique opportunity for this laser-focused community to share recent scientific findings, and importantly, the state of development of neurotherapeutic interventions, translation to clinical practice, and on-going evaluation. Together, we will consider, explore, and act to alter the trajectory of outcomes for the pediatric population with neurotherapeutic interventions. This think tank will provide opportunities for networking, future collaborative work, and in particular, identify optimal ways to bridge science and practice to alter practice and outcomes effectively.

With new scientific knowledge of the capacity for activity-dependent plasticity following neurologic injury in adults and children, healthcare professionals have additional neurotherapeutic tools available to alter the trajectory of outcomes. The scientific community continues to build on a strong foundation of evidence to provide new means to restore neuromuscular capacity, achieve novel outcomes, and improve quality of life. This is particularly relevant to the pediatric population with neurologic injuries and disease with direct impact on the child, as well as a positive effect on family and caregivers. The rapid and successful translation of such evidence to clinical practice remains as a critical step in the process of scientific inquiry to improve the health and quality of life of children. Continued evaluation upon translation can inform clinical practice, for example, as to who benefits, the rate of change, durability of effect, reduction of healthcare utilization, and impact on family and caregivers.

Pediatric NeuroRecovery Summit 2019
Frazier Rehab Institute
Boardroom 15th Floor

AGENDA

Thursday, May 16

4:30 – 5:00	Tour of clinic and lab—optional Meet in Frazier Rehab lobby, 220 Abraham Flexner Way, Louisville, KY, 40202
5:00 – 6:00	Registration & Networking
6:00 – 7:00	Dinner by Divinity Fine Catering
7:00 – 8:00	Andrea Behrman, PhD, PT, FAPTA *Pediatric NeuroRecovery: Where "Kids Kick Paralysis" and Through Science Have Every Reason to Hope* 'Management' of pediatric-onset spinal cord injury (SCI) has been the mainstay of rehabilitation, clinical decision-making and medical care. There has been little to no expectation that intervening therapies could alter the course of outcomes for children. Healthcare professionals use 'anticipatory guidance' to alert parents as to future health risks historically associated with pediatric-onset SCI and with little capacity to avert such risk. The discovery that the spinal cord is 'intelligent' has been the catalyst for the development of neurotherapeutics focused on recovery (or acquisition) of neuromuscular capacity below the level of injury. The possibility of a new trajectory of outcomes, health, function, and quality of life is providing real hope to families of children with spinal cord injury.

Friday, May 17

7:30 – 8:00	Tour of clinic and lab - optional Meet in Frazier Rehab Lobby
8:00 – 8:30	Registration & Posters Coffee, tea, water, variety of granola bars and fruit available Bring your own water bottle—optional

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8:30 – 9:30 Jaynie Yang, PhD, PT

Early, Intensive Leg Training to Enhance Gross Motor Function in Children with Perinatal Brain Injury

Children with early brain injury in utero or around birth are at risk of developing cerebral palsy. We studied the efficacy of activity-intensive leg training in children with perinatal stroke and those with encephalopathy from prematurity, between the ages of 8 mos—3 years old, to determine if the intervention is better than standard care.

9:30 – 10:30 Kat Steele, PhD

Motor Control Matters: Strategies to Quantify and Improve Control for Kids with Cerebral Palsy

Every brain injury is unique, which makes customized treatment to improve movement challenging for kids with cerebral palsy. Built on foundations from neuroscience and rehabilitation, new strategies for quantifying altered motor control are emerging that can be used to inform and optimize treatment.

10:30 – 10:45 Break

10:45 – 11:45 Sandy Saavedra, PhD, PT

Emergence of Upright Posture: An Engineer/ Clinician Collaboration to Map Typical and Atypical Control Mechanisms

We use a segmental approach to trunk control for two purposes. First, we use engineering-based systems identification to quantify postural mechanisms during intermediate stages of trunk control in children who lack independent sitting. Second, we explore the effect of optimal trunk support on function and participation in real world environments.

11:45 – 12:30 Lunch by The Café

12:30 – 1:00 Posters

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AGENDA

1:00 – 2:00	April Herrity, DC, PhD *Evidence-Based Approach to Recovery of Bladder Function after Pediatric SCI* Bladder dysfunction is one of the most important factors influencing overall health and quality of life in children living with a spinal cord injury. Gaining an understanding of the capacity for activity-dependent plasticity to drive recovery in the pediatric bladder can help bridge the gap between spinal cord injury research and clinical urology.
2:00 – 3:00	Parent Panel
3:00 – 3:15	Break
3:15 – 4:15	Small groups
4:15 – 4:30	Wrap-up
4:30 – 5:00	Tour of clinic and lab - optional
5:15	Cocktails (and dinner) On Your Own 8UP Elevated Drinkery & Kitchen, 350 W Chestnut St, Louisville, KY, 40202 Optional

SPEAKERS

Andrea L. Behrman, PhD, PT, FAPTA
Professor, University of Louisville

Andrea L. Behrman is Professor at the University of Louisville, Kosair Charities Endowed Chair in Pediatric Neurorecovery, Department of Neurological Surgery, Kentucky Spinal Cord Injury Research Center, Louisville, KY. Dr. Behrman is the Director of the Kosair Charities Center for Pediatric NeuroRecovery providing activity-based therapies to promote recovery from neurologic injury in children and conducting research to inform clinical practice. She also is a Co-Director of the Christopher and Dana Reeve Foundation NeuroRecovery Network that provides standardized activity-based therapies for individuals with spinal cord injury (SCI) at six adult rehabilitation centers in the United States and now two pediatric sites. As a physical therapist, her research, funded by NIH, Neilsen Foundation, Department of Defense and Helmsley Foundation focuses on developing therapeutic interventions promoting recovery after SCI in children and adults using principles of activity-dependent plasticity and an understanding of the neurobiology of motor control and walking. She partners with basic scientists as a collaborative team conducting bi-directional translational research from bench to bedside to playground/park bench and back. She most recently received the Anne Shumway Cook Lectureship from the Academy of Neurology, APTA for contributions to clinical practice. Behrman received a B.S. in Biology from Furman University, an M.S. in Physical Therapy from Duke University and a Ph.D. in Motor Control and Learning from the University of Florida.

April Herrity, DC, PhD
Assistant Professor, University of Louisville

Dr. Herrity's research background and interests have focused on understanding the neural mechanisms involved in controlling urogenital and bowel function after neurologic injury. In particular, she has examined the impact of activity-based training in combination with spinal cord epidural stimulation on the recovery of bladder, bowel and sexual function. Her work spans across adult and pediatric studies as well as includes complementary animal model approaches, resulting in productive collaborations with numerous interdisciplinary investigators. Currently, Dr. Herrity is investigating the use of spinal cord epidural stimulation to specifically target the bladder with the goal of identifying optimal stimulation parameters that promote functional gains in lower urinary tract function. Additional efforts are aimed at understanding the effects of locomotor training on the recovery of bladder function in children as well as addressing the prevalence of urinary tract infections after spinal cord injury. Her work within the NeuroRecovery Network is also examining quality of life outcomes associated with spinal cord injury.

Dr. Herrity holds a PhD in Anatomical Sciences and Neurobiology, as well as a Masters in Anatomical Sciences and Neurobiology, both from the University of Louisville in Louisville, Kentucky. Prior to these achievements, she completed a Doctor of Chiropractic degree from Cleveland Chiropractic College in Los Angeles, California, graduating as summa cum laude and Valedictorian. She continues her clinic work on a part-time basis in Louisville, KY.

Sandra Saavedra, PhD, PT
Associate Professor, University of Hartford

More than 30 years' experience as a pediatric physical therapist provides the motivation, passion and resilience behind Dr. Saavedra's drive to discover the underlying mechanisms for upright posture control. Dr. Saavedra has a clear vision of the burden of care and paucity of activity-based protocols for children with deficits in trunk control. Her clinical background provides the necessary expertise to develop child friendly protocols and to facilitate the best possible cooperation and responsiveness when dealing with young infants and children with moderate-to-severe cerebral palsy (CP) who are frequently non-verbal. Her enthusiasm for this work inspires dedication, commitment and collaboration from fellow scientists, clinicians, research assistants, families and children who participate in her research studies.

As an NIH-funded doctoral student (F31NS056726) at University of Oregon, she laid the groundwork for the segmental approach by developing the first adjustable trunk support unit and introducing the concept of segmental assessment of trunk control for typical infants and children with neuromotor deficits to the United States. During her NIH-funded postdoctoral work (F32HD068118) at University of Michigan, she began exploring the segmental contributions of trunk control to functional movements (reaching and stepping). As a professor at University of Hartford, she established a clinician/engineering collaboration with Dr. Adam Goodworth. Their initial NIH-funding (R03 DC013858) allowed the development of protocols and pilot data using a perturbation platform and trunk stabilization device that allows modeling of sensorimotor contributions to postural control prior to independent sitting. This work provides the first glimpse at the emergence of upright control in typical infants and allows us to begin understanding deficits in trunk control from a mechanistic perspective. Their recent funding from NSF (DARE1803714) offers the opportunity to extend the trunk support device to segmental sway referencing and subsequently to explore motor learning at the level of individual trunk segments.

SPEAKERS

SPEAKERS

Kat M. Steele, PhD
Associate Professor, University of Washington

Kat M. Steele is an Associate Professor in Mechanical Engineering at the University of Washington. Her research focuses on need-based, human-centered design to improve quality of life for individuals with diverse abilities. She leads the Ability & Innovation Lab, which integrates dynamic musculoskeletal simulation, motion analysis, and device design to improve movement after neurologic injury. She also co-directs AccessEngineering, an NSF-supported program to encourage individuals with disabilities to pursue careers in engineering and integrate topics on universal design and accessibility into the engineering curriculum. She earned her BS in Engineering from the Colorado School of Mines and MS and PhD in Mechanical Engineering from Stanford University. To integrate engineering and medicine, she has worked in multiple hospitals including Denver Children's Hospital, Lucile Packard Children's Hospital, and the Rehabilitation Institute of Chicago. She has been awarded an NIH Career Development Award in Rehabilitation Engineering, NSF CAREER Early Faculty Development Award, and the American Society of Biomechanics Young Scientist Award. More information about Dr. Steele's research is available at: http://steelelab.me.washington.edu

Jaynie Yang, PhD, PT
Professor, University of Alberta

Jaynie Yang is a professor in the Department of Physical Therapy, University of Alberta, Canada. She is also a member of the Women and Children's Health Research Institute, and the Neuroscience and Mental Health Institute at the University. She has undergraduate training in physical therapy, with doctoral and post-doctoral training in biomechanics and neurosciences, respectively. Her research interest centre on how the nervous system controls walking in people, and ways to retrain walking in individuals with neurological insults. She is best known for her work with young infants, in which she showed that stepping movements in the very young follow the sensory control rules of other mammals, and are present well before independent walking. Current work focuses on activity-intensive leg exercise, initiated at a young age, to improve walking and gross motor function in young children with early brain injury. Other projects focus on neural plasticity induced by walking training, such as with a powered exoskeleton in adults with spinal cord injury, and more fundamental questions regarding how people of all ages learn and retain new walking conditions, such as on a split-belt treadmill.

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