Course Number	Title	Level of Content	Author	
Tuesday February 28, 2017 - Full Day 8-Hour Pre-Conference Workshop				
PC01	**Go Baby Go: An Innovative Method to Provide Mobility for Children**	**Intermediate**	**Ana Allegretti**	
Independent mobility is an important milestone in a child's life and can pave the way towards overall independence in growth and development of spatial cognition, emotional skills, and self-awareness. In non-ambulatory children this often presents a challenge as they are limited in the exploration of their environment. The effects of restricted mobility during early childhood have been shown to lead to a pattern of apathetic behavior, specifically a lack of curiosity and initiative. For children with severe motor impairments who are not learning to walk at the same age as peers, power mobility affords opportunities to engage in more independent exploration of their environment and provides them with opportunities to express cognitive as well as social and adaptive abilities. These non-ambulatory children should be given the opportunity to move independently by the age of 12 months. Given the cost, size and social stigma, power chairs are considered 'last resort' technology to be used only after training for functional walking has failed. This experience can be provided through different power mobility devices. Ride-on cars (modified off-the-shelf toy cars) are emerging as an option. They are feasible, enjoyable, and readily available in the United States.				
PC02	**Foundations of Wheelchair Seating & Mobility Evaluations**	**Beginner**	**Patricia Tully**	
This fundamental class will walk through the major components of wheelchair seating and mobility evaluations (WSM). We will start with discussing overarching concepts of WSM and cover basic funding and documentation requirements as related to evaluations and equipment letters of medical necessity. In an interactive discussion, we will identify common postural deformities and note how they relate to seating and mobility needs; walk thought a supine and sitting mat evaluation relating the findings back to decision making for equipment decisions; and practice standard measurement taking relating those measurements back to equipment decision making. We will have a variety of equipment present to represent general categories of equipment. The class will have hands on time to look at the variety of equipment and discuss appropriate applications for: wheelchair frames, parts, accessories, and seating components. We will touch on the basic pros and cons of these items during decision making related to WSM. The course participants will have a thorough reference to use for further learning after the class. Finally, we will share several case presentations to highlight clinical decision making as related to spinal cord injury, brain injury, cerebral palsy, bariatric needs, pediatric concerns, and other neurologic illnesses and/or injuries.				
PC03	**Set Up for Success! Trials and Tribulations of Wheelchair Setup and Delivery**	**Intermediate**	**Tina Roesler**	
In this hands-on workshop we will explore the intricacies of final seating and mobility fitting and delivery. We will discuss aspects of the final fitting including wheelchair configuration, seating and positioning selection and set up, and the importance of fine-tuning available adjustments for function and propulsion. Each small group break out will have the opportunity to adjust and fit a unique seating and mobility system to a member of the group. We will discuss the choices and clinical rationale behind those decisions and examine different service delivery models that can be used. From taking the chair out of the box, to adjusting components and seating, the attendees will have a chance to get their hands on the tools of the trade. They will be expected to made critical frame adjustments such as axle position, back height and angle, seat to floor height. Furthermore, they will be asked to make appropriate cushion and back selections and appropriately mount those items on their selected mobility device. After optimizing the chair for their selected "client", they will assess the final configuration for function and propulsion efficiency. In the second half of the session, the attendees will use the properly configured chairs to put their skills to the test. In small groups, we will practice instruction and completion of a variety of wheelchair skills from propulsion to wheelies, and more. We will discuss the importance of these skills in everyday life and present strategies for instruction and incorporation into your usual plan of care. The session will wrap up with a review of the day's activities, presentation of case studies, and an active discussion about service delivery models and their impact on client satisfaction and functional success. *This session is supported by a company with reported interest in the sale of Assistive Technology products. The content has been reviewed by ISS personnel and determined to be appropriate for continuing education purposes.*				
Wednesday March 1, 2017 - Half Day Morning 4-Hour Pre-Conference Workshop				
PC04	**Shoulder Evaluation: An Evidence-Based Approach for Clinicians**	**Intermediate**	**Wendy Koesters**	

Shoulder pain following SCI in recent studies has found the incidence as high as eighty percent. Given the high evidence of shoulder pain in SCI and the overuse of the shoulder with any manual wheelchair user, clinicians are frequently called upon to evaluate and establish treatment programs for these individuals. What evidence are clinicians using to evaluate the shoulder complex? The overall goal of this course is to provide PT's, OT's, TR's, ATP's a foundation of "neuro-orthopedic" based evaluation techniques and principles for the shoulder complex to implement into practice. The course will give hands on demonstration of specific assessment tools and lab to practice these techniques. We will utilize the most current evidence to establish: a more comprehensive understanding of glenohumeral joint and scapulo-thoracic biomechanics as it relates to pathology of the shoulder in individuals with spinal cord injury, enhance examination techniques to correctly identify shoulder pathology, design algorithms to rule out other possible causes of shoulder pain, and provide attendees with effective strategies to incorporate into their practice for guiding the wheelchair selection process. By clinicians applying and integrating a comprehensive orthopedic approach into treatment planning and seating recommendations, wheelchair users will be given the opportunity to reduce the incidence of shoulder pain and UE impairments.

PC05	**Empowering Individuals to Ensure Safe Wheelchair Transportation**	**Beginner**	**Danielle Morris**	

Individuals who use wheelchairs face challenges in accessing safe vehicle transportation. A lack of knowledge, skills and training, and poor access to proper equipment, resources and funding often result in misuse. Misuse and uninformed choices place individuals at an increased risk for injury.
Development of a comprehensive program to help teach individuals, families, and community members about safe transportation should be lead by the therapists, medical professionals, and rehabilitation specialists who provide and help monitor and maintain wheelchairs. This interactive session will guide participants in gaining the knowledge and skills needed to facilitate safe transportation for individuals seated in wheelchairs. Safe transportation is accomplished by completing comprehensive assessments and by providing extensive initial and ongoing training to ensure that wheelchairs are well maintained and are being secured safely. Class participants will explore design features and accessories that will improve positioning and safety during transportation. They will gain knowledge of the laws, policies and guidelines, so they can make informed recommendations. Case studies and discussion will help participants analyze barriers and solutions, to provide individuals with disabilities and their families with safe transportation.

PC06	**Coding and Reimbursement for a Successful Seating Clinic**	**Beginner**	**Barbara Crume**	

Correct coding and documentation for therapy reimbursement is critical to the success of any outpatient clinic or home health provider. This course will include information on Current Procedural Terminology (CPT) and how to use these codes for wheelchair seating and mobility services. Documentation of the evaluation and treatment intervention will be included to demonstrate provision of skilled care and use of the CPT Codes. For those patients insured by Medicare, the selection of G-codes and tools to select modifiers will be presented and discussed. Many consumers with complex functional mobility needs depend upon dedicated Seating and Wheeled Mobility (SWM) Clinics for specialty CRT clinical services. SWM Clinics are increasingly under scrutiny to demonstrate cost- effectiveness or risk closure. This course provides information to support proper coding and documentation to enhance efficiencies for sustainable clinical CRT services.

PC07	**Dynamic Seating - Providing Movement and Why**	**Intermediate**	**Michelle Lange**	

Dynamic seating provides movement which occurs within the seat and/or wheelchair frame in response to force from the client. Dynamic components absorb force which, in turn, assists the client back to a starting position. Most wheelchair seating systems are static. If the client is able to move, this movement is independent of the seating system. Providing movement within the seating system and/or wheelchair frame allows the client to move while maintaining contact with support surfaces to provide stability and reduce shear forces. Dynamic seating has many applications. For clients with increased muscle tone, dynamic components absorb and diffuse this force, increasing seating tolerance, reducing extensor posturing and maintaining the client's overall position. By absorbing force, dynamic components also reduce wear and tear on the seating system and wheelchair. Research has demonstrated that agitated clients often calm in response to movement and sub-aroused clients become more alert. Movement provides sensory input and many clients seek this out. Movement is critical. By moving, the brain is developing through neuroplasticity. Dynamic seating may be integrated within a wheelchair and typically include more than one area of movement. Other dynamic seating options are modular, can be placed on a variety of wheelchair frames and capture one specific area of movement. Common modular options capture movement at the pelvis, knee and head.

Wednesday March 1, 2017 - Half Day Afternoon 4-Hour Pre-Conference Workshop				
PC08	**The Wheelchair Clinic Experience: Effective, Efficient, Empowering**	**Intermediate**	**Nicole LaBerge**	

Challenges within a wheelchair clinic are present whether you are the therapist, vendor, or patient. The frustrations can often outweigh the successes causing delays, improper seating and positioning, impaired mobility and overall dissatisfaction.
Representatives of the Complex Rehab Technology (CRT) Team will debate the common practices of a wheelchair clinic in this interactive course. Ideas and research will be presented from each team member's perspectives on how to improve the wheelchair evaluation, fitting, and delivery process. Examples will include implementing outcome measures, promoting patient advocacy, educating those with less equipment experience and maximizing team communication.

PC09	**Power Assisted Technology: Evidenced Based Practice**	**Intermediate**	**Penny Powers**	

Power assist technology has evolved over the past twenty years. Evidence reveals that repetitive stress injuries (RSI) are common in users of manual wheelchairs(MWC). The goal of power assist technology is to decrease the repetitive use of upper extremities (UEs) in propulsion to improve function and decrease pain. Preservation of the upper extremities can delay the need for power mobility and ultimately diminish the need for surgery. This half-day course is designed to provide in-depth review of the UE anatomy contributing to MWC self-propulsion, review of functional strength assessment, review formal manual muscle testing, and pain assessment in order to document an accurate therapy evaluation. A comprehensive therapy evaluation coupled with the end user's functional impairments contributes to optimum functional outcomes. A review of the three primary manufacturers of power assist technology on the market will be presented including, design/specifications, don/doff procedures, cost, and case studies using these technologies. The three models will be available for on-site assessment/trial by the participants. Screening criteria will be provided to help identify appropriate end users and configuration of power assist technology. Funding considerations and documentation requirements will be presented. This half-day course will include Power Point instruction, case studies, videos and demonstration.

PC10	**Vehicles and Modifications: Considerations for the AT Team**	**Intermediate**	**Amy Lane**	

Participants attending this session will gain an understanding of vehicle options, vehicle modifications and adaptive driving equipment commonly used in driver rehabilitation, through the use of lectures, power point, videos, and demonstration of equipment in the exhibit hall. An individual's independence and sense of autonomy are strongly influenced by their ability to have access to transportation options, enabling them to participate in other meaningful areas in their life. Driver rehabilitation programs provide comprehensive evaluations, training and education, to address the transportation needs of driver and passengers. Many types of programs are available to the consumer; however it is critical that they are provided with the right resources, the right services, at the right time. The Certified Driver Rehabilitation Specialists (CDRS) and the Seating and Mobility Specialist (SMS) each play a unique role for clients who will be driving or transported in their wheelchair. Each specialist can present additional concerns and issues needing to be addressed by the evaluation team. Based on this and other factors, adaptive equipment and vehicle modifications are customized to the client's needs. In effort to meet the transportation needs of the consumer, collaboration between the CDRS, the SMS, AT team, vehicle mobility equipment dealer and funding sources are necessary to find transportation options that are safe, practical, and cost effective for the end user.

Wednesday March 1, 2017 - Full Day 8-Hour Pre-Conference Workshop

PC12	**Mobile Device Access and Integration for Wheelchair Users**	**Intermediate**	**Emma Smith**	

Mobile devices, including phones, tablets, and wearable devices have seen rapid growth in the past few years, becoming vital in our daily lives. For clients who use wheelchairs, these devices have the potential to substantially improve access to communication, computing, and environmental control. Wearable devices, including the Apple Watch, are now beginning to address specific needs of wheelchair users in their operation. The potential of these devices to address individual needs of wheelchair users is largely dependent on whether the individual can access the device reliably. This is impacted by the level of integration between the wheelchair and the device, and access to the device itself. It is critical for wheelchair and seating professionals to have an understanding of the device capabilities and integration, to ensure access is taken into account when wheelchairs and seating are prescribed. This BYOD (bring your own device) pre-conference workshop will provide hands on opportunities for clinicians to learn and practice the skills necessary for setting up and training clients for mobile device use. We will explore alternative access to touch interfaces for iOS and Android, including voice and switch access options, device mounting considerations, and specific integration with powered wheelchair electronics packages. The use of case-studies will provide opportunities to apply new knowledge, and ensure participants leave the workshop with relevant clinical skills.

PC13	**Pressure Injury Management for Rehabilitation Professionals**	**Intermediate**	**Darren Hammond**	

Pressure injury management continues to be a challenge in healthcare. Commonly in pressure injury management, the team begins to consider management strategies prior to a full complete assessment and investigation into the actual cause of a pressure injury. Typically, topical dressings are considered, advanced modalities may be chosen, bed and wheelchair support surfaces are investigated; however, consideration into the management of the extrinsic risks, including a full seating assessment of a client who may have a sitting acquired pressure injury, is somehow commonly overlooked. Unfortunately, knowledge and skill sets of superior seating and positioning strategies along with effective clinical practice of pressure injury management is lacking across practice settings, particularly in physical and occupational therapy settings. In this interactive presentation, discussions will provide foundational knowledge regarding the skin, normal physiology of healing and the factors affecting healing and repair. In addition, this workshop will focus on reviewing the new research regarding the etiology of pressure injury formation and staging guidelines, as well as, key assessment and documentation strategies to provide better services for clients in all care settings and the community. Specific to this presentation, we will also review some of the specific clinical practice guidelines, which revolve around seating, positioning and mobility related to pressure injury management.

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PC14	**Powered Mobility Training for First Time Users**	**Intermediate**	**Karen Kangas**	

Children are not small adults. Training strategies cannot possibly replicate the strategies used with adults. Children who have cognitive challenges, visual processing problems, complex bodies, who are non-speaking need desperately to be independently mobile, yet are frequently not considered candidates for powered mobility as the standards used for "candidacy" are identical to adult paradigms. Children cannot be tested for skills as they are developing them, and how to use powered mobility within their environments takes very different knowledge and teaching strategies to support their quest for mastery. The chair's physical configuration must be different. The programming must be different, and frequently altered as experiences are supported. The seating must also be different, and very different than the seating most children are utilizing for being fed or for safe passive transport to school programs. Driving skills are also completely different than what is expected for adults, and judgement cannot be "judged" as judgement in children does not develop until extensive experience has been attained. We will share how to work with very young children, and older children who "failed" in the past, or not been considered candidates for power. This course is challenging and is not for beginners.

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PC15	**Postural Care: Supporting People Night and Day**	**Intermediate**	**Tamara Kittelson-Aldred**	

24-hour postural management has been discussed and developed since the 1980s outside North America, but here it is a newer, not commonly used approach. Lying and sitting posture parallels can be seen during mat evaluations, but are often not fully understood and addressed when planning seating interventions. Gravity, time and asymmetrical postures must be reckoned with during hours spent in bed or relaxing outside the wheelchair, as the habitual postures of a person with limited movement can easily become obligatory. Over time gravity coupled with asymmetry can lead to or worsen complications like rib cage distortion, scoliosis, hip dislocation, pelvic obliquity and rotation. These require complex and expensive seating systems, whose benefit and function are counteracted by unsupported postures out of the wheelchair. Such problems threaten health and quality of life for wheelchair users and challenge seating practitioners, but can often be limited, avoided or improved with supported lying and sitting postures. Postural care involves analysis and understanding of destructive and supportive postures and the forces at play. This workshop will provide background and theory related to 24 hour postural care, and instruction in practical implementation strategies. Hands-on practice with therapeutic positioning using a variety of common and more specialized supports will offer experience in planning night postural care interventions that will support successful seating outcomes.

Thursday March 2, 2017 - 8:30am to 10:30am

SS2	**Opening Session**	**Beginner**	**Kenneth Ottenbacher**	

Our opening session will include a number of speakers, including Symposium Director Mark Schmeler. There will also be brief presentations from each of our poster presenters, outlining the topic of their posters. The opening will feature a Keynote by Kenneth J. Ottenbacker, PhD, OTR, on "Large Data."				
PO1	**Poster Viewing for CEU-Credits**	**Beginner**	**Various**	
In order to receive CEU credit for viewing posters, you will need to register for this session and be present in the Exhibit Hall poster area for at least 1.5 hours between 10:30am-1:00pm on Thursday. More details for how to obtain CEU codes will be provided on site.				
PO1.1	**Early Mobility Intervention: An Innate Right**	**Beginner**	**Azalya Hernandez**	
Mobility is a right that allows participation, engagement, and facilitates meaningful occupations. Non-ambulatory young children have this basic right of mobility and independence denied due to physical disabilities. Research over the past thirty years has demonstrated benefits of self-directed mobility as well as early use of powered mobility technology. In typically developing infants, the onset of crawling and walking has been associated with changes across developmental domains: perception, cognition and socialization. This literature review aims to identify the evidence regarding non-ambulatory young children and the effect of early powered mobility. It will encompass children's mobility needs regarding improvements in socialization and independence in activities of daily living. These components are also of value to the parents, therefore it is essential to include their personal perceptions on early powered mobility. We are reviewing additional research articles at this time, but currently have 16 articles dating from 1983-2015. The review will include a matrix that highlights each study's purpose, level of evidence, intervention and outcome measures, results, and limitations. Our study will provide evidence-based research to enable clinicians' to advocate for early power mobility in young non-ambulatory children.				
PO1.3	**The Effect of Wheelchair Back Support Shape on Reach Accuracy**	**Beginner**	**Atsuki Ukita**	
A main activity performed by wheelchair users is reaching. The flat back support shape of conventional wheelchairs may negatively impact trunk stability due to poor pelvic support; however, this has not been investigated. In this study, we examined the effects of back support shape and pelvic support on the musculoskeletal system and reach accuracy. Sixteen healthy individuals performed a reaching task 10 times while seated in a conventional wheelchair (C-WC) and in a wheelchair with pelvic support (P-WC). The task consisted of reaching forward and placing a cone on a target in front of them as quickly as possible. The displacement between the cone center and the target, the root-mean-square (RMS) values of EMG signals from the trunk and upper limb muscles, and the coefficients of variation (CV) of each muscle were measured. Data were analyzed using the Wilcoxon signed-rank test. The displacement between the cone and the target was smaller in the P-WC than in the C-WC. The RMS values were larger for the trunk and smaller for the upper limb muscles in the P-WC than in the C-WC. CV values between trials were smaller in the P-WC than in the C-WC. Supporting the pelvis during reaching improves trunk muscle activity and reduces upper limb muscle activity. In addition, pelvic support decreases variability in muscle activity during repeated motions. These results indicate that pelvic support improves reaching performance.				
PO1.4	**Sheet Type Sensor for Monitoring of Shear Force on Wheelchair**	**Intermediate**	**Shigeru Toyama**	
A main activity performed by wheelchair users is reaching. The flat back support shape of conventional wheelchairs may negatively impact trunk stability due to poor pelvic support; however, this has not been investigated. In this study, we examined the effects of back support shape and pelvic support on the musculoskeletal system and reach accuracy. Sixteen healthy individuals performed a reaching task 10 times while seated in a conventional wheelchair (C-WC) and in a wheelchair with pelvic support (P-WC). The task consisted of reaching forward and placing a cone on a target in front of them as quickly as possible. The displacement between the cone center and the target, the root-mean-square (RMS) values of EMG signals from the trunk and upper limb muscles, and the coefficients of variation (CV) of each muscle were measured. Data were analyzed using the Wilcoxon signed-rank test. The displacement between the cone and the target was smaller in the P-WC than in the C-WC. The RMS values were larger for the trunk and smaller for the upper limb muscles in the P-WC than in the C-WC. CV values between trials were smaller in the P-WC than in the C-WC. Supporting the pelvis during reaching improves trunk muscle activity and reduces upper limb muscle activity. In addition, pelvic support decreases variability in muscle activity during repeated motions. These results indicate that pelvic support improves reaching performance.				
PO1.5	**Firefly Products Used for Functional Play and ADLs in Kids with CP**	**Beginner**	**Molly Fugate**	

Commercial products are very useful and inexpensive ways to provide postural support to infants with functional limitations secondary to a neuromuscular diagnosis, such as cerebral palsy. As these children age and their bodies grow, commercial products are not able to provide adequate postural support to allow children to participate in functional play and activities of daily living. Complex rehab equipment can be a turn off to most families with very young children with special needs. Equipment can be expensive, take up too much space in their home, and does not appeal to most parents because they want their child to look "normal" and most equipment looks too medical for an infant. We will show how our clinicians help parents explore alternative positioning using Firefly products, such as the Upsee, GoTo Seat, Playpak and Scooot, for functional play and activities of daily living. We have performed case studies to show how our clinicians work together with caregivers to use Firefly products in the patients' daily routines at home and within the community. These patients have cerebral palsy and require alternative positioning with external support to maintain functional positions. With the support provided by Firefly products combined with the collaboration of creativity and knowledge of our clinicians and caregivers, we are able to provide an opportunity for our patients to actively engage and participate in age-appropriate play and activities of daily living.

PO1.6	**We Give People Possibilities; Special Adaptations for Activity**	**Beginner**	**Bjarte Hjorthaug**	

Our challenge has been to create a sitting unit that enables tricycling and riding a horse, for a lady with severe disabilities. She is active in dressage riding and show jumping, and wanted to try cycling as well. She has severe deformities in her spine, pelvis, hips and legs, and significantly reduced sitting balance. She sits in a "mermaid-pattern," and moves around using her arms.

For her horseback saddle, she had a specially adapted one from earlier in her life, now worn out. Based on experiences from the first saddle, we decided to make a molded seating unit, to be installed on an ordinary horseback saddle. Because of the significant deformities, it was challenging to place the midline, to give her a steady placement on the horseback. She also has a three-wheel handtrike. In an ordinary handtrike she used too much effort to keep balance on the seat. Additionally, it was difficult to find a good placement of the feet, to avoid ending up wider than the width of the trike wheels. To give appropriate support to her body, and a good starting position for cycling, the solution was a molded seat installed on the handtrike.

Special adaptations are time-consuming processes where the result is not given in advance. Molded seating on a horseback saddle and three wheel handtrike was new to us. She definitely trikes independently now, and transfers on/off the trike alone. She also became Norwegian Champion, and Nordic Champion in para dressage! The saddle ended with functional stability, although not perfect.

PO1.7	**Innovative New Custom Seat Design; Clinical Case Examples**	**Advanced**	**Leisa Lang**	

Pressure, friction, shear, and microclimate are the extrinsic factors contributing to the development of skin and tissue trauma. A US-based rehab technology innovator has developed a strap-based custom wheelchair seat cushion with the design emphasis focus on a "quadruple approach"; optimizing pressure, friction, shear, and microclimate mitigation simultaneously in one single custom seating system. This technology has been clinically applied in over a dozen cases by this author, who is a private practice complex rehab provider. The goal of this presentation is to describe this new design and the patient molding process, from the supplier perspective, and share multiple case examples showing its effectiveness and capability.

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PO1.8	**Using Friction Management to Prevent and Treat Pressure Injuries**	**Advanced**	**Mark Payette**	

Evidence suggests that friction causes shear stresses and strains in the tissue of wheelchair and prolonged bed users leading to increased risk of skin trauma at the surface and in deep tissues. New solutions are needed since simply addressing the 'pressure factor' is incomplete. Friction, and the shear stress and strain (distortion) that this causes, is a significant contributor to skin trauma. Despite the many products focused on pressure management, there are currently very few interventions addressing friction and shear. This presentation highlights a promising new intervention.

Strategic Friction Management (SFM) employs friction reduction interfaces to target trouble areas (those areas with wounds or at risk). SFM manages contact forces in much the same way as is done for pressure. These contact forces may be from positioning or sitting support equipment, from beds or other devices, and are also present during any and all transfers. Individuals might not remain in their ideal chairs at all times - what happens to them when they are sitting on other support surfaces such as in a vehicle? Practitioners and users are challenged to reduce the harmful friction and shear forces from these surfaces as well.

This presentation discusses how a new SFM technology works and illustrates the uses and clinical effectiveness through multiple case examples, and discusses experiences of care givers and consumers.

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PO1.9	**IAD: Can Reducing Friction and Shear Heal and Prevent Recurrence?**	**Advanced**	**Caroline Portoghese**	

Incontinence Associated Dermatitis (IAD) can be a difficult problem to resolve and then is frequently a recent issue for people due to the subjecting of fragile skin to ongoing shear and friction. What if there was a product that significantly reduced the shear and friction factor? These case studies illustrate the experiences of multiple individuals with recurrent IAD where a very low CoF technology was added to the normal treatment protocol along with the observations of expert wound care clinicians. The low friction technology is a dual layer, breathable fabric technology that glides smoothly against itself absorbing friction-induced shear stress to prevent tissue damage in at-risk areas. The technology is applied as a Strategic Friction Management intervention.

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PO1.11	**Live Measurement Versus Photogrammetry for Seating Assessments**	**Intermediate**	**Jacqueline Hall**	

23% of all Veterans live in rural areas with over 3 million individuals relying on VHA services. These individuals have multiple barriers to health care parity including limited transportation, limited access to specialists, and limited in-home services.
Telehealth (TH) services including video-teleconferencing (VTEL) for wheeled mobility has been effective in providing efficient seating and mobility evaluations for individuals who have limited access to complex mobility clinics. Store-and-forward (SAF) telehealth involves use of stored clinical information for use at another site and/or time, however there is limited information about the use of SAF and more specifically photogrammetry for seating and wheeled mobility clinical service provision.
A study is underway to determine the validity of in-person seating measurements versus use of digital image photogrammetry. 40 individuals will be randomly selected from all seen during a 3-month time period in the VAPSHCS Mobility Clinic for comparison of in-person versus digital image measurements while in a seated position. A second clinician will use photogrammetry to take the same measurements from the digital images. Results of statistical analysis of concurrent validity of measurement techniques are anticipated to provide recommendations for usability of photogrammetric applications and digital imagery for mobility clinic telehealth services.

PO1.14	**Successful Outreach DME Program in Puerto Rico**	**Intermediate**	**Christin Krey**	

Providing appropriate custom durable medical equipment (DME), can be challenging in any geographical area. Additional challenges occur in an outreach setting. Over the course of the last 10 years, Shriners Hospitals for Children- Philadelphia (SHC-P), in conjunction with a national DME supplier that has a branch local to Philadelphia, has been able to successfully accomplish the challenging task of servicing the pediatric population of Puerto Rico (PR). PR has one of the highest rates of people with disabilities of all ages: 20.8%. The percentage of school-aged children with disabilities is nearly double that of the overall percentage of the United States; and they are primarily part of low income families with insufficient health care. SHC-P has been coordinating medical care in PR since 1966, and currently has over 2,000 active patients in PR, who are all treated under the mission that all children are treated equally regardless of ability to pay. It was realized early on that many children of PR were provided with sub-par and ill-fitting equipment for which the families overpaid - often all out of pocket. In 2007, the DME portion of the SHC-P outreach program became solidified. The children are referred from one of the treating SHC-P physicians and are evaluated by one of the therapists. Clinics are run 2-4 times per year, during which equipment is delivered, repaired or any additional follow up needs can be addressed.

PO1.15	**Eleanore's Project: Wheelchairs and 24-Hour Postural Care in Peru**	**Beginner**	**Thelma Wakefield**	

Eleanore's Project was founded in 2004 with a mission to improve the quality of life for children with disabilities and their families, through provision of appropriate wheelchairs and related services with particular focus on sustainability in collaboration with in-country partners. In 2007 Eleanore's Project began working with Yancana Huasy in San Juan de Lurigancho, Peru, a partnership that has continued for 10 years. During this time a year round wheelchair service has been established with a biomechanical workshop to support repairs (2010), 24 hour postural care was introduced (2012) and Yancana Huasy staff have begun outreach to under-served areas in their country. This poster shares the evolution and development of a postural care program at Yancana Huasy incorporating responsible wheelchair provision for daytime use with night postural care being implemented by families of children with motor impairments.

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PO1.18	**Biomechanical Effects of Training on Wheelchair-Commode Transfers**	**Intermediate**	**Stephanie Rigot**	

Transfers are one of the most physically demanding, yet frequent tasks that a wheelchair user performs. The aim of this study was to determine if transfer training improved the upper extremity biomechanics of independent wheelchair transfers to a commode for both a front and side approach. Manual wheelchair users (n=24) performed 5 transfer trials from each angle while biomechanical data was recorded. Of enrolled participants, those with skill deficits (n=16) as determined by the Transfer Assessment Instrument were invited to receive personalized transfer skills training. Eleven individuals participated in the training, and then repeated the transfer protocol. Kinetics and kinematics of the shoulder, elbow, wrist, and trunk were calculated and compared to baseline. After training, participants decreased their maximum shoulder elevation on the leading (left) side ($p<0.01$), as well as elbow flexion and total motion for both extremities during the front approach ($p<0.04$). Trunk flexion increased, suggesting improved use of the head-hips relationship ($p=0.00$). The resultant force and rate of rise of the resultant force and moment decreased for the shoulder, elbow, and wrist of the trailing extremity ($p<0.03$). The leading extremity had decreased rates of rise of the resultant forces for all joints during the side approach ($p<0.04$). Targeted transfer training may help reduce injuries by decreasing harmful upper extremity positions and loading, especially with the side approach.

Thursday March 2, 2017 - 1:00pm to 2:15pm

IC01	**Using The Science of Materials to Compare Wheelchair Cushions**	**Intermediate**	**Darren Hammond**	

Too often therapists and providers who recommend seating and positioning products do not fully understand the reason(s) behind the design and the specific characteristics of product options. Prescribers sometimes rely on generalized assumptions, sales and marketing spin, and historical effectiveness for their justification regarding choosing one seating product over another. It seems that the process involved in selecting clinically appropriate seat cushions for our wheelchair seated clients has switched gears somewhat from a purely artistic approach to perhaps a more evidence based or science based thought process. This is a welcome change in our industry and one we can all embrace. This program will provide foundational knowledge of an alternative approach to the way the health care community chooses various seating support surfaces when discussing skin integrity, positioning and stability. A basic overview of scientific mechanisms by which load is applied and the resultant forces, which occur, will be discussed. Using scientific principles, the majority of the discussion will review the materials and the various design methods used to construct cushions in order to provide specific therapeutic benefits. In addition, participants will gain a greater understanding of varying load redistribution properties used to achieve specific clinical outcomes. Finally, quantifying methods used to compare and contrast wheelchair cushions will be discussed.

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IC02	**Complex Rehab Technology Update**	**Beginner**	**Donald Clayback**	

The world of Complex Rehab Technology (CRT) is undergoing significant changes. This session will review the legislative and regulatory issues in play that have a direct impact on access at the federal and state levels. Topics will include the Medicare Separate Benefit Category, the impact of Competitive Bidding, state Medicaid matters, and other important initiatives and trends. We'll also review the tools available to promote access to CRT with policy makers and payers and how to use them effectively.

IC03	**What's in a Back?**	**Beginner**	**Jane Fontein**	

This hands on workshop will explore the properties of back supports and their impact on seating and positioning. Through demonstration and trial, the attendees will assess the differences from sling upholstery, tension adjustable, rigid backs and custom. Often when a referral for a skin injury is sent to a therapist it will request the therapist to look at the cushion, however the back support is an integral part of the seating system and needs to be considered as an equal partner to the cushion. In fact a full seating assessment should be performed. From the assessment the shape and size of the back can be determined and the properties required. A review of the properties and their clinical implications will be discussed. Do you need a tall back if the client is tall? Where do you need support? What angles are required? What about lateral support or rotation? How to improve propulsion with back support?

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IC04	**Update on Functional Mobility Assessment and Uniform Data Set**	**Intermediate**	**Mark Schmeler**	

Standardized outcome measures and associated datasets are necessary to improve evidence and accountability in the field of mobility assistive equipment. This session will present updated developments in the Functional Mobility Assessment (FMA) registry along with the development of accompanied Uniform Data Set (UDS). Challenges and strategies associated with the implementation of standardized measures in clinical routine and associated data collection, aggregation, and analyses will be discussed from previous work and current collaborations with VGM/U.S. Rehab, The Ohio State University Medical Center, and Veteran's Administration.

IC05	**The Integration of Wheelchair Mobility and Home Accessibility**	**Intermediate**	**Julie Gaby**	

Home accessibility is often defined as the ability to approach, enter and navigate through the environment safely. With the advancement in both wheelchair and assistive technology in the last 5 years, the potential for the client to not only navigate, but control the environment allows the client greater comfort, safety and independence within their home. Advances such as seat elevation, anterior tilt and midwheel vs front wheel drive systems allow greater access for transfers, activities of daily living and mobility, while the advancement of Android and Apple products along with I Home and Alexia allow the client greater control of their environment. Knowledge of both area is imperative for the mobility professional to be able to successfully provide the client with their accessibility needs. This power point presentation will give specific examples of the products and services that integrate together and can best serve the client in their mobility and accessibility needs.

IC06	**Go Baby Go? Stakeholder Perceptions of Powered Mobility Provision**	**Intermediate**	**Heather Feldner**	

Mobility has been recognized as a basic human right; the efficacy of early powered mobility experiences for children in fostering independence and participation is increasingly endorsed. Yet, the relationship between mobility and technology provision, when considered in the context of lived experiences of children with mobility impairments and their families, is complex and understudied. Children's own voices are especially limited. Further, little is known about the direct and indirect influences of the industry on these child and family experiences.

This session explores novel research that uses qualitative and participatory action methods to explore and contrast the experiences of children and families and industry influences from within two distinct provision models, via a traditional powered wheelchair and a GoBabyGo modified ride-on car. It also introduces an analysis of these provision processes using a social model perspective of disability, and a social justice approach to mobility intervention. Understanding user experiences and industry influences from a qualitative perspective is essential to many stakeholders seeking or developing mobility technology solutions. Incorporating these perspectives is critical in advancing the features of pediatric devices and provision practices, and is essential in promoting further commitment to mobility advocacy, environmental and attitudinal accessibility, and more explicit child/family involvement in user-centered design.

IC07	**The Wheelchair Drive Control as a Critical Positioning Device**	**Intermediate**	**Michael Flowers**	

Many seating assessments focus solely on the postural support required for alignment, skin protection, tone management, and function. Such assessments fail to consider input device/platform location and operation. It is also essential to consider the influence of input device location on the mechanics required to activate and sustain control while navigating physical and sensory elements within the power wheelchair user's environment. Ignoring drive control location may promote fatigue and cause destructive postural tendencies caused by the control's location, as the user often continues to maintain these positons while stationary. Research utilizing dynamic pressure-mapping, 3D kinematics and dynamic EMG demonstrate that accessing a control in an armrest-mounted location forces a change in body posture and weight distribution, while requiring increased muscle force as compared to centrally-mounted controls. Positioning a control at midline on a platform with bilateral supports can facilitate improved driving control and posture, allowing the seating products to perform as they were designed to function. This hands-on instructional course will demonstrate different mounting methods that allow clinicians to quickly position a variety of input devices in the optimal location required by their client's individual needs. Discover why PWC drive controls share the same three fundamental rules of real estate...location, location, location.

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IC08	**Development of Wheelchair Standards for Less-Resourced Settings**	**Intermediate**	**Anand Mhatre**	

Reports that wheelchairs fail frequently and prematurely in less-resourced settings are likely due to shortcomings in product standardization and regulation in these settings. Higher durability and reliability is needed for wheelchairs used in these settings as they are subjected to unique environmental and use conditions. The standards published by the International Standards Organization (ISO 7176) test wheelchairs for durability, safety and performance but their applicability to products used in the unbuilt environment is unclear. Because of this, wheelchair-related guidelines and reports published by The World Health Organization recommended developing more rigorous durability tests for wheelchairs. This presentation will cover the quality issues reported with wheelchairs in less-resourced settings and the need for developing additional quality standards. The Standards Working Group of International Society of Wheelchair Professionals have recently designed and developed appropriate test methods to address this need. The talk will include these developments and the future work to be conducted by this working group on wheelchair quality standards for less-resourced settings.

PS1	**Paper Session 1**			
PS1.1	**Health Outcomes of Wheelchair Seated Posture in Older Veterans**	**Advanced**	**Lelia Barks**	

We posit that wheelchair seated posture is predicted by and mediates certain health outcomes. We describe wheelchair seated posture over 1 day, and its relationship to posited predictors and health outcomes in two VA community living centers. Our findings allow us to report a correlational, observational study, describing the relationship of quantified wheelchair seated posture to certain predictors, such as cognitive status, supporting surfaces, sitting ability, repositioning frequency, sitting duration, and independent wheelchair mobility. The outcomes determined were interface pressure, functional reach, pain/discomfort and Health Care Acquired Pneumonia. We included 45 Veterans over the age of 62 who sit in a wheelchair daily for 5 hours, for periods of at least 2 consecutive hours. We excluded Veterans with spinal cord injury, amputees, those with BMI over 35, and those with open pressure injuries. We collected data at four different time points over the day. These times were upon arising, two hours later, in the mid-afternoon, and again two hours later. The participants were out of the wheelchair for two hours after lunch. FSA BodiTrak pressure mapping mats were placed under participants for the two-hour morning and afternoon periods, measured at start and end of the period.

PS1.2	**Developing a Seating Intervention for Older Veterans**	**Advanced**	**Lelia Barks**	

In this paper, we describe barriers, facilitators, and shared practices in positioning older Veterans in wheelchairs in the VA Community Living Center (CLC). To do this, we used focused interviews and purposive snowball sampling of direct care providers of wheelchair positioning. These included nursing assistants, licensed practical nurses, registered nurses, and kinesiotherapists. Afterwards, data was placed into Atlas.ti software 7.1.7, and coded using content analysis with concurrent memoing. The codes were then synthesized into themes and reliability checked by two other investigators. The facilitators of positioning Veterans in wheelchairs were as follows: higher quality equipment (wheelchairs with "tilt"); sufficient staffing; the interdisciplinary team process, specific CLC practices, and training. The barriers to positioning that we found were the following: physical factors (equipment and logistics), Veteran condition (pain, toileting needs, behavioral tendencies or preferences, diagnosis,) and insufficient staffing. We also found that staff identified skin breakdown as an outcome of poor seating. Only two staff members had received any formal training in positioning residents in wheelchairs. The staff members identified facilitators as resource issues, such as adequate staffing, equipment and training. These factors became barriers when absent or of poor quality. We used the data to develop a seating intervention.

PS1.3	**The Experience of Spinal Cord Injury and Wheelchair Use**	**Intermediate**	**Jenny Lieberman**	

This paper explored how three individuals with spinal cord injury (SCI) made sense of their experience of having SCI. The participants in this study had no history of SCI prior to their accidents. After each of their accidents, they all had to redefine their life. Initially, they could not conceive of a meaningful future. Their previous reality of who they were and their future goals was altered by the damage to their spine. Their friends, mentors and family provided the support they needed to ultimately imagine a meaningful future. This process took several years, as they learned to understand and experience their new bodies and way of being in the world.

The participants identified that mutual communication with their treatment team was essential when establishing meaningful goals both in therapy and during the wheelchair evaluation because they did not understand their changed body yet. They needed assistance to understand why they felt the way they did and how their current actions would result in improvement in the future. One reality they all had to live with was life in a wheelchair. Initially, they were each aware of the wheelchair and overwhelmed at the possibility of having to use one. Ultimately, though they maintained a sense of sorrow over having to rely on the wheelchair, they developed an understanding of the necessity of the wheelchair for living a meaningful life. They also identified the importance of involvement in assessment for their wheelchair.

PS1.4	**Specialty Clinical Experience in Seating and Mobility**	**Beginner**	**Penny Powers**	

As the number of individuals with disabilities requiring mobility assistance increases, there is a greater need for therapists to be trained in Seating and Mobility. The Clinician Task Force and industry leaders are collaborating with the APTA Neurology Section to develop expectations for seating and mobility. Suppliers of Complex Rehab Technology (CRT) express frustration with the inability to access Physical Therapists (PT) and Occupational Therapists (OT) who are knowledgeable in seating and mobility. Lack of access to trained professionals puts patients at risk for suboptimal care. To address this need, part-time and full-time clinical experiences for PT students were developed. Learning experiences encompassed specific tools for comprehensive assessment and equipment recommendations, inter-professional clinics, and working directly with suppliers in the clinic, workshop, school and home environments. In addition to the Clinical Performance Instrument, the students completed an evaluation and a follow-up survey. Student feedback was positive, indicating skills learned were applicable to future practice. Training of future professionals in the area of Seating and Mobility is essential to improving access and facilitating the best patient outcomes. With specifically designed experiences, specialty settings for clinical affiliations can provide entry-level students with unique experiences that address this identified need and support the development and refinement of their entry-level skills.

Thursday March 2, 2017 - 2:30pm to 3:45pm

IC09	**Understanding Pressure Injuries for Effective Prevention**	**Intermediate**	**Amit Gefen**	

Understanding the etiology of a pressure injury (PI) is pivotal to prevention. We provide a 360-degree analysis with an assembly of the world's thought-leaders, including researchers, clinicians, and engineers – all of whom approach PI prevention in seated clients from their areas of expertise. Central to this discussion are the findings of the world's first and largest randomized clinical trial (RCT) of wheelchair cushions, where we discovered how air-cell-based cushions can significantly reduce the incidence of PIs. Additionally, we will look at the biomechanical aspects of soft tissue protection and the importance of immersion and envelopment through adequate adjustability and adaptability of the cushion. Specific topics address the convergence of ten years of PI research: Why different PI types occur (covering deep tissue injury and the distinct contributions of deformation versus ischemic damage). A clinician's look at deep tissue injury (presenting definitions, timelines and clinical presentation). The RCT of cushions (efficacy of various cushions in PI prevention and a look at how laboratory-derived performance measures relate to clinical outcomes). What makes a cushion effective for PI prevention (presenting the risks of seating, the utilization of the latest bioengineering tools e.g. seated MRI coupled with finite element modeling and cell culture research to analyze these risks). The research is translated into practical considerations when prescribing a cushion.

IC10	**What's the Latest: Medicare Documentation & Coverage Requirements**	**Intermediate**	**Claudia Amortegui**	

2016 was a tumultuous year for Medicare reimbursement of DME. There were cuts in reimbursement, updated policies, and changes in claim submission. Where do these changes leave us today when it comes to ordering and providing the proper wheelchair and making sure the suppliers are properly paid. Are clients having to rent their high level CRT power wheelchair? Do they have to rent the separate options? Is a therapist required to complete an evaluation and write an LMN? Is my client required to use a specific supplier? What is the time frame to have all documentation completed? These are just some of the questions that will be addressed during the session. This session will provide the latest Medicare updates as they relate to complex rehab technology (CRT). We will also discuss the most current coverage policies and documentation requirements. Whether you are a clinician ordering equipment or a supplier providing equipment, you must be up to date with all the details to ensure the best service for your client.

IC11	**Optimizing the Ride: How Manual Wheelchair Configuration Enhances Function**	**Beginner**	**Jennith Bernstein**	

Technology continues to allow us to enhance and modify manual wheelchair configurations. Factors such as: frame materials, tires, wheels, casters, and frame length, all contribute to performance and function as well as how much force and effort is required for wheeled mobility. When a clinician, supplier, and client understand how to pair wheelchair skills with wheelchair prescription, the best possible outcome and maximal riding experience occurs. This course will review recommendations regarding optimal wheelchair configuration, summarize research to support component selection, as well as demonstrate propulsion over terrain with an optimally configured chair, as compared to a sub-par chair. We will identify how to prioritize chair configuration to optimize propulsion and skills, both with and without power assist. Discussion will take place regarding how to find a balance between stability and instability to allow maximal function in all planes of seated movement.

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IC12	Powered Wheelchair Provision: Current Practices and Opportunities	Intermediate	Emma Smith	

The World Health Organization recognizes the importance of wheelchairs as an intervention and outlines a service provision process which ideally includes assessment of client needs, goals, capabilities, and driving capacity, followed by training to address individual needs. We conducted a survey of over 300 wheelchair/seating providers (clinicians, AT providers, and rehab assistants) from across the USA and Canada to determine current practices, tools and techniques used for assessment and training of powered wheelchair use. We found substantial variability in assessment and training practices, with limited use of evidence based tools. While the majority of clinicians rely on clinical judgement to make decisions regarding powered mobility, factors which contribute to their decision making (i.e. refusing training to individuals with a diagnosis of dementia) are often not based in current evidence. Using the results from this survey as a springboard, we will explore current clinical practices in assessment and training and research evidence which supports (or does not support) these practices. We will then facilitate a discussion of tools and techniques used by clinicians for assessment and training, and factors which contribute to clinical decision making. Finally, a discussion of gaps in knowledge relating to powered wheelchair assessment and training will inform future clinical research to support best-practice in powered wheelchair provision.

IC13	Posture, the Missing Link in Finite Modeling	Advanced	Alexander Siefert	

In a clinical setting the wheelchair's seat angles, knee angles and back support angles are adjusted according to the needs of the individual. Complications associated with these adjustments are common and include: increased stresses at weight bearing tissues, skin integrity issues, sliding and discomfort. But what is exactly the effect of these postural interventions on skin integrity, sliding tendency and the wheelchair user's comfort levels and can these effects be predicted? A 3-dimensional model which incorporates posture of the human body has been developed recently which can be used to investigate seat designs with respect to crash tests, comfort requirements and tissue deformation. This 3 - D model offers the opportunity to compute internal tissue stresses at the buttock area with different postures and seating angles. Because of the vast amount of possible postural adjustment options its effect on tissue loading would be impossible to obtain through clinical trials.
This presentation will show first the general capabilities of 3D Finite Element Modelling incorporating posture and its requirements for the applications to assess wheelchair designs and tissue deformation. Finally results regarding the influence of the posture and seat angles on tissue loads will be presented.

IC14	Understanding Paediatric Mobility Needs from Parental Perspective	Intermediate	Sheila McNeill	

A vast array of wheelchairs and adaptive strollers are available for young children with mobility needs. Although commercial products may be sufficient initially, by about 18 months these no longer meet their needs. However, for many reasons, parents of young children often prefer a stroller to a paediatric wheelchair and it is not uncommon for families to require multiple conversations about the idea of evaluating for a wheelchair. Understanding clients' needs can be a challenge as lifestyle, preferences and beliefs must be taken into account. Yet parents are often more perceptive in noticing the effects of clinical interventions and clinicians. Clearly a greater understanding of parental views will improve clinical prescription, wheelchair design and long term use. A study was undertaken to understand mobility needs of children from a parents' perspective. The study included: how parents viewed the transition from stroller to wheelchair, what they perceived as the most important factors in wheelchair provision, and how the family interacted with the product during everyday family life. The parents of 678 children replied to an online questionnaire regarding the mobility needs of their child. Through analysis of the results, participants will gain an understanding of the issues for parents regarding the transition to a wheelchair, how the current prescription is used on a daily basis, and crucially how a paediatric wheelchair impacts on family life.

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IC16	Assistive Robotics to Support Activities of Daily Living	Beginner	Dan Ding	

People who use powered mobility devices often experience functional limitations in reaching and handling that are critical in completing basic activities of daily living (ADLs). Despite the advancement in surgical restoration and use of neuroprosthesis through functional electrical stimulation, there is still a gap in providing viable solutions to support upper limb functions among these individuals. Assistive robotic manipulators (ARMs) present a promising solution by supporting long-term daily use without the need of being donned and doffed, and accommodating a wide range of diagnoses as long as they can use a joystick or switch control to operate a powered wheelchair. It is projected that the rehabilitation robotics market (including assistive robotics) will grow 40-fold between 2014 and 2020. In this workshop, we will discuss the basics and research around two popular ARMs (i.e., JACO by Kinova Robotics and MANUS/iARM by Exact Dynamics). In addition to the basic operation, we will also discuss the existing acquiring process of ARMs and evidence on their effectiveness on providing assistance on ADLs. We will introduce a custom ARM assessment tool that could potentially aid the prescription and training of ARMs. We will demonstrate a few alterative control interfaces including voice control, touch control, and vision-based control. The workshop will feature presentations, live demos, and videos, and provide opportunities for the audience to try different control interfaces.

PS2	**Paper Session 2**			
PS2.1	**Adapting Commercial Wearable Fitness Technology for Manual Wheelchair Users**	**Beginner**	**Kalai Tsang**	

Over half of wheelchair users in America, even if able, do not engage in physical activity at recommended levels. They are more likely to have obesity, diabetes, and heart diseases than the general public. To reduce the risk of these chronic illnesses, preventative measures such as promoting regular physical activities are needed. One of the prerequisites as well as strategies to promote activity participation is to obtain accurate estimates of daily activity. In the past decade, the use of fitness wearable to quantify physical activity has become popular. Fritz et al. examined the impacts of using fitness wearable in 30 people. It was found that they were highly motivated to reach the "goals"; and later, most of them demonstrated long term behavioral changes and adopted more active lifestyles. While the general public has access to a plethora of fitness wearable, wheelchair users still have no equivalent means to track their physical activity. Therefore, our goal is to adapt commercial fitness wearable for wheelchair users. We developed/evaluated custom models to quantify physical activities based on different types of fitness trackers. The custom models were more accurate in estimating energy expenditure in wheelchair users than the default models used in the devices. The error of custom models was within 20% when compared to the gold standard; while that of default models ranged from -19% to 300%. Wheelchair users could use the commercial fitness devices after adaptation.

PS2.2	**Assessment of Seat Elevator User Satisfaction**	**Beginner**	**Vince Schiappa**	

A retrospective analysis was conducted on clients recommended power wheelchairs (PWCs) with seat elevators (SEs). Three items of the Functional Mobility Assessment (FMA) were analyzed; reach, transfer, and total score (TS). Cases were assigned to one of the three following groups; PWC users with a SE at time 1 (T1) but using a new device without a SE at time 2 (T2) (SE – NSE, n = 14); PWC users with a SE at T1 and using a device with a SE at T2 (SE – SE, n = 42); and PWC users without a SE at T1 but using a device with a SE at T2 (NSE – SE, n = 67). For the SE-NSE group, there was a significant decrease for reach ($p = .03$). There were no significant changes for transfer ($p = .48$) and TS ($p = .57$). For the SE-SE group, there were significant improvements in reach ($p < .01$), transfer ($p < .01$), and TS ($p < .01$). For the NSE-SE group, there were significant improvements for reach ($p < .01$), transfer ($p < .01$), and TS ($p < .01$). SE procurement indicates a SE can increase satisfaction of PWC users.

PS2.3	**Evaluating Wheelchair Transfer Technique by Microsoft Kinect**	**Intermediate**	**Lin Wei**	

Improper transfer technique predisposes wheelchair users to upper arm pain and injuries. Education of proper technique is not well disseminated and clinicians have limited time to work with wheelchair users to develop their skills. Microsoft Kinect is a low-cost marker-less motion capture device with the ability to detect body motion and may serve as a tool that could assist clinicians and wheelchair users with practicing and learning proper transfer technique. The purpose of the current study is threefold. Firstly, it is to associate the Kinect motions during wheelchair transfers with a gold standard measure of transfer quality (Transfer Assessment Instrument (TAI). Second, it is to develop regression models that relate the Kinect variables to the TAI scores. Finally, the study aims to validate and test the Kinect's accuracy for determining if a patient is using proper or improper transfer technique. We aim to achieve 80% accuracy with the models. Thirty full-time wheelchair users performed five sitting pivot transfers from their wheelchair to a level-height bench. A trained investigator scored the TAI and the Kinect simultaneously recorded the body's motion data for each transfer. The associations between the transfer motions, subject anthropometrics, and TAI's component item scores will be examined using clustering and logistic regression modeling methods. Leave-one-out cross-validation will be used to investigate the accuracy of the models.

PS2.4	**Effectiveness of Transfer Training for Wheelchair Users with Multiple Sclerosis**	**Intermediate**	**Laura Rice**	

Transfers are necessary to allow full time seated wheeled mobility device users (SWMDU) to perform activities in daily life. (Nyland et al., 2000) Due to the progressive nature of Multiple Sclerosis (MS), formal transfer training is often not received. Incorrect performance can result in upper extremity injuries and/or falls(Curtis et al., 1995). The purpose of this study is to examine the efficacy of a transfer training program for SWMDU with MS. With IRB approval, 16 SWMDU with MS were recruited. SWMDU attended two sessions, 12 weeks apart. At baseline, SWMDU performed 4 transfers to and from a mat bench utilizing their preferred technique. The quality of the transfer was assessed using the Transfer Assessment Instrument (TAI). After the baseline assessment, SWMDU were educated on transfer skills by a PT utilizing written and verbal instructions and a video. SWMDU were re-evaluated 12 weeks later using the same protocol. SWMDU were an average of 58 years old and lived with MS for an average 17 years. Nine SWMDU used a manual wheelchair, 6 a power wheelchair and 1 a scooter. After exposure to the education program, TAI scores significantly improved. (Pre-Intervention: 6.1 ± 2.3, Post-Intervention: 8.0 ± 2.3, $p = 0.001$). Such improvements are noteworthy as no structured educational interventions are available for SWMDU with MS and improvement in transfer skills may improve community participation and quality of life.

Thursday March 2, 2017 - 4:00pm to 5:15pm				
IC17	**Early Vs. Late Intervention with Custom Molded Seating**	**Intermediate**	**Thomas Hetzel**	

Historically, custom molded seating has often been relegated to last ditch efforts to preserve an individual's ability to sit. Typical users are often dependent sitters with multiple disabilities, significant postural deviations and associated unique body shapes. In many instances the physical characteristics of traditional custom seating has been deemed appropriate for this population, but frequently proved to be too heavy, bulky, and restrictive to be considered for more active and functional users, and was rarely justified in the realm of early seating intervention. Recent advances in custom molded seating based on orthotic and prosthetic principles that incorporating lighter, breathable and less bulky materials has significantly expanded the potential for custom seating application across a broader range of needs, and as a potential option for early intervention.
This workshop brings attention and direction to this potential by presenting unique seating strategies for early custom seating intervention. It is not just about a custom shaped seat and back, but about correct orientation of the seating for a constructive relationship with gravity, and optimal wheelchair configuration and seating interface to maximize the potential for mobility, function, and skin care. Client assessment, simulation, and fitting strategies will be discussed as well as documentation of need.

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IC18	**Updating Referral Sources on Medicare Wheelchair Requirements**	**Intermediate**	**Laura Cohen**	

Medicare has identified physicians and non-physician practitioners (NPPs) (physician assistants, nurse practitioners, clinical nurse specialists) as responsible parties for initiating, ordering and documenting medical necessity for manual and power wheelchairs. Yet, physicians and NPPs often receive little education and training about these technologies and are often unfamiliar with Medicare DME policies (LCDs and policy articles) even more than 10 years after implementation. Education and training of referral sources can help both clinicians (PTs/OTs) and rehab technology practitioners (RTPs) to obtain appropriate documentation and paperwork the first time. This not only improves effectiveness and efficiency for both the clinician and the RTP but ensures that appropriate documentation is on file with the supplier in the event of an audit. The Clinician Task Force has created educational materials and will present a model for information dissemination to referral sources. Participants will leave with action steps they can use in their organizations to help disseminate information upon their return.

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IC19	**Environmental and Mobile Device Access for Power Wheelchair Users**	**Intermediate**	**John Doherty**	

For persons with physical impairment, use of mobile devices, computers, and environmental control is limited by their ability to access these devices. The optimal benefit for a person with special challenges for using these devices is based upon a person's reliable capacity to access and control these devices and can be achieved by integrating with their powered wheelchair. Successful application of an integrated wheeled mobility system, inclusive of mobile technology, is based upon a comprehensive evaluation of the person's needs across their multiple customary environments, their typical mobility related activities of daily living, and work/school demands. This session will focus on the assessment process, considerations and methods to customize and configure power chair electronics, use of custom and commercially available stationary and user-operated motorized mounting hardware, and use of mobile devices that can be pragmatically integrated into a reliable method for independent control. A power wheelchair can then function as a "dashboard" to allow independent access and operation of multiple power wheelchair controls including driving, power positioning needs, medically necessary environmental devices, mobile phone, computer use, and use of speech recognition for writing purposes. Case studies will also be used to provide examples for learning purposes.

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IC20	**Developing Competencies for Seating & Mobility Specialists**	**Intermediate**	**Maureen Story**	

It takes time and comprehensive training to become a proficient seating therapist or technician. At Sunny Hill Health Centre for Children we wanted a systematic way to train new therapists and technicians on our team, identifying present skills and targeting knowledge gaps. A tool was needed to measure knowledge and set learning goals based on self-evaluation. After exploring the tools that were available, we chose a tool that has traditionally been used in the nursing profession, the CAPE Tool. The CAPE Tool is defined as Competence Assessment, Planning and Evaluation Tool. Two documents were created describing the competencies required to be a seating therapist and seating technician. We reviewed other competency frameworks such as the RESNA Seating & Mobility Specialist Certification Exam Readiness Tool and the Seating to Go credentialed competencies in developing our CAPE tool. The CAPE Tool breaks down the required criteria for foundational and specialized skills. It has a rating scale to determine where the therapists/technician skills are at and highlights key resources that apply to the criteria, suggests recommended learning activities and has the ability to track when these skills have been met.
We will review the layout of the CAPE tool and discuss the process used to develop this tool. We will demonstrate how we used it to define competencies for both seating therapists and technicians. We will share these documents with the participants.

IC21	**The Past, Present and Future of Tilt & Recline**	**Intermediate**	**Karen Ball**	

In this session, past, present and possible future design of tilt-in-space and recline frames will be explored, as well as clinical relevance. Tilt-in-space chairs have been utilized for more than 30 years as a means of shifting weight while maintaining a static seat to back angle. Tilt-in-space chairs have evolved from a single posterior pivot point design, requiring a longer wheel base for stability, to the center of mass design with improved stability and shorter base. Presently, when choosing system tilt for a client several design features are available including: the plane in which the tilt occurs, direction & degree of tilt, and location of tilt axis placement on the frame. Clinical rationale for each will be presented, For example, anterior tilt may be used brief periods for feeding and reach, whereas lateral tilt may aid client with GE reflux.
Manual recliners have existed for almost 100 years. The evolution of recline will be explored with regard to design mechanics, shear reduction and extrinsic factors that alter their function. Present clinical rationale, as well as, present & future recline design to address shear will be examined. Most significant for power recline has been the incorporation of a raised pivot or displacement of the back support surface against the seated consumer to reduce shear. What is shear, where exactly does it occur, how has it historically been addressed and where is design heading in the 21st century for improved outcomes?

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IC22	**A Pommel Does What?**	**Intermediate**	**Lauren Rosen**	

People who use wheelchairs have individual needs to for seating and positioning to achieve the best outcomes. As there are a number of types of support that can be given to a person, frequently, well-meaning therapists and suppliers select the wrong supports for a particular problem. This usually leads to further problems and more complex issues. One commonly seen misuse is prescribing abduction pommels to prevent sliding. These devices are made to keep a person's hips more neutrally positioned. When used to stop sliding, a patient's genital region takes a large amount of pressure, which is uncomfortable and can cause medical issues. In many cases, properly adjusted pelvic belts, seat to back angles, and better cushion choice can successfully prevent sliding without injury to the person. In pediatrics, there are many pieces of positioning equipment added to wheelchairs as preventative measures. Laterals are universally placed on many chairs for children to prevent the development of scoliosis. Research does not support this yet clinicians and suppliers continue to apply this technology to most children. This class will discuss common pediatric and adult seating and positioning issues and how to address them for the best outcomes. Case studies and research will be included to illustrate the points.

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IC23	**A Lifespan Blueprint for DME: Cerebral Palsy**	**Intermediate**	**Jonathan Greenwood**	

The Durable Medical Equipment (DME) Blueprint is a means of summarizing the potential needs of a child throughout their lifespan to best prepare therapists, physicians and families to make educated decisions on equipment selection over time. The overall cost analysis will be reviewed as a means to prepare for upcoming changes in reimbursement structures and health care systems to analyze the costs associated with the care of patients with complex medical needs such as children with cerebral palsy. Because of the known functional status of children with cerebral palsy stratified by GMFCS level and age, we can expect to make certain clinical recommendations and forecast certain equipment needs over the lifespan of children with cerebral palsy. Clinicians, physicians and families vary in their introduction of DME to support the growth, development and function of the child. This instructional course is a look at recommendations throughout transitions and over time by GMFCS level for children with cerebral palsy in order to best prepare for potential needs based on the expected development of the child. This program will describe the indications, timing and costs for using Durable Medical Equipment (DME) with children having a diagnosis of cerebral palsy. It will identify when equipment is needed, when to introduce this equipment and how much this equipment costs over the lifespan for this population.

IC24	**Advances in Upper Body Function; Here Come the Robots!**	**Beginner**	**Chantal Bérubé**	

With the new focus on upper body function for high level tetraplegics, persons with ALS, and many others with upper limb motricity impairments, robotics has come to the forefront. Now, with so many robotic devices entering the world market, it is wise to get a grasp of this market and see how you can use robotics to overcome barriers to performance of your clients. However, all robots are not suitable for all clients with upper body disabilities, and vice versa. To recommend appropriate devices, it is imperative to understand the characteristics of those robotic devices. Also, personal factors as well as environmental factors must be considered to optimize individual's participation.

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PS3	**Paper Session 3**			
PS3.1	**Beyond Mobility: Above Knee Amputee Case Study**	**Intermediate**	**Michael Bender**	

This presentation explores the psychosocial barriers and solutions experienced by an above-knee amputee who had recently been discharged home from inpatient rehab. Mobility, home, and work environment interventions were provided. The roadblocks to intervention from psychosocial illness were addressed by a team effort of the referring vocational rehab counselor, OT clinician, ATP supplier, prosthetist, job developer and employer. The collaborative effort resulted in a successful mobility and employment outcome supported by the Modified Psychosocial Illness Impact-PROMIS measure. The Psychosocial Impact of Assisstive Devices Scale (PIADS) was used to measure how the mobility device impacted his quality of life.

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PS3.2	**Advocating Necessity for Bluetooth Power Mobility Integration**	**Intermediate**	**Raheleh Tschoepe**	

Clinicians and assistive technology (AT) professionals assess activity limitations and context to determine interventions. We are obligated to present effective AT that facilitates participation and quality of life. This case describes a process between an outpatient home-based OT, a manufacturer representative (ATP), a DME supplier (ATP), and physiatrist, to acquire AT for a client with MS. Medicare initially denied the funding request because the AT did not meet criteria for medically necessary DME. This is a poignant example of funding too often driving decisions, overriding clinical reasoning, client need, and best practice. The purpose is to demonstrate how Bluetooth interfacing, integrated through a power wheelchair to a tablet, provided a client with complex impairment the ability to communicate and promoted safety and psychosocial wellbeing. It demonstrates how: AT returned independence, voice, and control; current policy conflicts with best practice and must be persistently challenged; our industry has an ethical and professional responsibility to demonstrate value in AT services; and to empower clients to express the value of these products and services to insurance providers and policy makers. As AT solutions advance, funding must stay relevant. The AT field must steadfastly research, develop, and prescribe the most effective solution for clients' needs based on best practice and not confine our clinical recommendations, scholarship, and pedagogy due to policy.

PS3.3	**Outcomes in a Community-Based Wheelchair Seating Clinic**	**Intermediate**	**Sue Tucker**	

This presentation will focus on practices utilized by a community-based wheelchair seating clinic to pilot test a self-report assessment battery to collect outcomes related to provision of new mobility devices. Short and long term outcomes were tracked through use of an assessment battery that included the Functional Mobility Assessment (FMA) and the Quebec User Evaluation of Satisfaction with assistive Technology (QUEST). A repeated measures within-subject design was used. Participants completed the first survey at an initial evaluation visit and then completed a short term survey 3-9 weeks after receiving a new mobility device and a long term survey 10-16 weeks after receiving the new mobility device. Repeated measures ANOVA and paired t-tests were used to determine significant differences. Significant changes in FMA scores were found from initial survey (T1) to short term (T2) follow up (means pre 46.0, post 53.7, $p<.01$) and from T1 to long term follow up (T3) (means pre 46.8, post 54.2, $p<.01$). Significant differences were found in 10/12 QUEST mean item scores from T1 to T2 and 8/12 QUEST mean item scores from T1 to T2. This project identified significant changes in satisfaction and functional mobility associated with provision of new mobility devices. These findings are clinically relevant because they may assist providers in understanding the impact of mobility devices on the lives of the people using them and may assist providers with justification.

PS3.4	**Motor Learning Approach for Training Manual Wheelchair Users**	**Intermediate**	**Sue Tucker**	

Developing an evidence-based approach to teaching wheelchair skills and proper propulsion for everyday wheelchair users with a spinal cord injury (SCI) is important to their rehabilitation. The purpose of this project was to pilot test manual wheelchair training based on motor learning and repetition-based approaches for new manual wheelchair users with an SCI. A repeated measures within-subject design was used. Six persons with SCI completed nine training sessions. At each testing session (Pretest 1, Pretest 2, and Posttest), kinematics related to propulsion and wheelchair performance overground were measured. Kinetic propulsion variables and wheelchair skills were measured before the intervention (Pretest 2) and after (Posttest). Repeated measures ANOVA and paired t-tests were used to determine significant differences. Significant changes in area of the push loop (means pre 27.0 cm2, post 336.6 cm2, $p < 0.01$) hand-to-axle relationship (means pre 27.1 cm, post 19.3 cm, $p = 0.03$), and slope of the push forces (means pre 149.1 N/s, post 114.8 N/s, $p = 0.03$) were found between Prettest 2 and Posttest. Trends in change of propulsion biomechanics related to a repetition-based motor learning approach for propelling a manual wheelchair were identified. The results of this study have clinical implications, as the motor learning principles used in the training program used during this research could be applied to teaching manual wheelchair skills during rehabilitation.

Thursday March 2, 2017 - 6:00pm to 8:00pm				
SS3	**Welcome Reception in Exhibit Hall**	**Non-CEU Session**		
Join us in the 70,000 square foot Exhibit Hall for food, drinks, and for a great opportunity to interact with our exhibitors.				
Thursday March 2, 2017 at 8:00pm				
SS1	**Social Event at the Country Music Hall of Fame**	**Non-CEU Session**		
Our ISS One Party costs $25 per person, and tickets are non-refundable. Please note that at this time, event tickets are available to ISS registrants only. If there are additional tickets available for sale at the time of the conference, we will have them for sale on site.				
Friday March 3, 2017 - 8:00am to 9:15am				
SS4	**Do We Really Need Big Data?**	**Beginner**	**Jean Minkel**	
Panel-style morning show session.				
Friday March 3, 2017 - 9:30am to 10:45am				
IC25	**The Other Seat! Critical Considerations for Bathroom Equipment**	**Intermediate**	**Sharon Sutherland**	
A great deal of time and resources are invested on skin integrity preservation and positioning strategies to help reduce the incidence of sitting acquired decubitus ulcers and postural deviations while sitting in manual and power wheelchairs. Regrettably, these individuals are still at significantly high risk of the same seating challenges if they are using improperly configured and poorly adjusted rehab shower commode chairs (RSCCs). For the past few years I have been working with clinicians globally enquiring about clinical best practices related to the prescription of rehab shower commode chairs. It is evident that there is a need for greater clinical focus in this area. It is my intent to focus on some very important assessment details that will help with our clinical thinking and translation to product parameters. For example, are we getting enough detail during our clinical assessment on where these individuals are when they are not in their wheelchair and how their skin is being protected? Are we using best practice guidelines for skin integrity preservation during the assessment process? We will review some critical pelvic anthropometrics along with postural analysis and ask ourselves what this means when investigating the essential clinical features of bathroom equipment. Finally, we will look at how interface pressure mapping can be just as helpful in the selection of rehab/shower commode chairs as it is in the selection of wheelchair seat cushions and back supports. *This session is supported by a company with reported interest in the sale of Assistive Technology products. The content has been reviewed by ISS personnel and determined to be appropriate for continuing education purposes.*				
IC26	**Rehab on the Ropes: Round 2 of the CMS Competitive Bid Program**	**Intermediate**	**Deborah Pucci**	

When The Centers for Medicare and Medicaid Services (CMS) awarded contracts for the second round of bidding in the spring of 2016, none of the large national rehabilitation technology suppliers in the Chicago area were included. The companies who won the bid were not regular providers of services for the Rehabilitation Institute of Chicago (RIC) wheelchair and seating clinic. Differences in education, experience, and exposure to working in a medical model of care, between the suppliers who won the second-round bid and those who previously held the bid, were significant. In the wake of this change, the RIC wheelchair and seating clinic was challenged with how to continue to provide a successful experience for Medicare beneficiaries who required mobility equipment included in the CMS contract. This session will examine the RIC seating clinic experience during the transition to working with the new competitive bid recipients. It will include an outline of the mobility equipment included in the competitive bid contract, the supplier obligations as outlined by the CMS contract, mobility characteristics of Medicare beneficiaries impacted by the bid, and the systems change incorporated by RIC. Outcomes from June through December of 2016 will be shared and discussed.

IC27	**Positioning the Head**	**Beginner**	**Michelle Lange**	

Many people using wheelchair seating require specific support of the head to maintain an upright position. This course will present strategies to position the head in wheelchair seating. Content will include causes of decreased head control as well as strategies to improve head control and position. Positioning the head requires much more than choosing the right head support. Options to provide posterior support as well as anterior options for those with significantly reduced head control will be reviewed and clinical indicators for each discussed. Case studies will be included.

IC28	**How Do We Learn the Skills to Become Seating Therapists?**	**Intermediate**	**Rhona Moot**	

Seating and mobility is an area of OT & PT practice which over the last decade has gained increased recognition and interest. OT literature regarding university education states that practice is becoming more complex and diverse and as a result curriculums can only provide a limited range of experiences. It could therefore be hypothesized that seating and mobility is not covered in the majority of university curriculums due to its specialism, raising the question how do new graduate therapists equip themselves with these skills? What type of learning experiences do they have to undergo in order to gain these skills and how effective are these methods in preparing them for this area of practice? An examination of OT and PT university curriculums in both the US and Europe will be presented and discussed and comparisons drawn in order to determine whether current curriculums include seating principles. Exploration of the learning experiences of graduate therapists working in seating and mobility gained through survey questionnaires will also be presented and discussed in order to identify the most common means graduate therapists gain the knowledge and skills to become seating specialists and evaluate the effectiveness of this learning. Examination of this information should help both the OT and PT professions establish if we are effective in preparing students to work in this area of specialism.

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IC29	**What Happens When You Sit? Explaining Seated Buttocks Deformation**	**Intermediate**	**Sharon Sonenblum**	

Over the past decade, pressure ulcer research has implicated tissue deformation in pressure ulcer development. This workshop will review the literature about the impact of tissue deformation and tissue breakdown, including both how cellular deformation itself can lead to damage as well as the indirect pathways of damage resulting from deformation. The workshop will then connect this understanding of deformation to what is known about tissue anatomy and deformation in sitting. Which tissues remain loaded under the ischial tuberosities during sitting and which are pushed out of the way? This workshop will present published results and exciting new data that compare tissue deformation of individuals seated on different wheelchair cushions. Offloading and redistributing of pressures using different materials result in tissues being displaced differently. We will present visual representations of buttocks (and maybe pass around some 3D printed butts) on different surfaces to help participants better understand and visualize the loaded buttocks. We will also quantify the deformation seen in those buttocks to help draw comparisons across individuals and cushions. Finally, we will present new data on the impact of seated posture on loaded anatomy and tissue deformation. In other words, we will try to answer how slouching impacts the tissues under the pelvis.

IC30	**Power Mobility for Children with Multiple Severe Disabilities**	**Beginner**	**Lisa Kenyon**	

Children with severe motor, cognitive, and communication deficits are limited in their ability to use self-initiated movement to explore and learn from the world around them. Such children are frequently dismissed as “too involved” or “too low functioning” to use power mobility. This session will provide details related to the interventions used in our power mobility training program for individuals who have multiple, severe disabilities (ages 9 months to 26 years). Potential benefits of power mobility training in this population will be examined and explored. Various intervention techniques focused on creating an engaging environment customized to target the emergence of basic power mobility skills through environmental exploration and play will be presented and discussed. Case studies and examples from our program will be used to illustrate key concepts. A standardized process to individualize these training methods for research purposes will also be presented. The role of an inter-professional team in providing power mobility options and use for children who have multiple, severe disabilities will be explored. Consideration of outcomes and expectations for the use of power mobility interventions in this unique population will be considered and reviewed.

IC31	**Meeting Lifetime Mobility Needs of Spinal Cord Injury and Disease**	**Intermediate**	**Kara Murphy**	

Persons with spinal cord injury or spinal cord related disorders such as multiple sclerosis and amyotrophic lateral sclerosis present with complex, often quickly changing seating and mobility needs. Working on a Spinal Cord Injury/Disease unit within the Veteran’s Health Administration, we are able to follow the individuals we serve through regular comprehensive multi-disciplinary evaluations. This enables us to work closely with our veterans and their families to ensure mobility needs are met throughout the aging process. In this session we will discuss changing mobility needs with progression of disorders and with aging, planning for those changes in need, and additional considerations to ensure our Veterans are able to return to/stay in their homes.

IC32	**An Introduction to Hybrid Alternative Driving Systems**	**Intermediate**	**Steven Mitchell**	

Alternative driving systems are frequently prescribed for users with SCI, ALS, or MS who cannot use a joystick. The simplest is the four function pneumatic switch ("sip-n-puff") which has been used successfully by many users who have good cognition and oral motor function. Proximity head arrays are often the alternative for those who are unable to use a sip-n-puff. While the technology may seem impressive, their success rate with these populations is significantly less. Does this mean we should have to accept a suboptimal outcome when someone needs to drive with head movements? Do we need to move on to eye gaze? Maybe thought control? Absolutely not! It's not that we need new technologies. We need to be able to implement existing technologies more-effectively. The most-recent generation of "plug & play" head arrays and switch interfaces give us unprecedented flexibility to take advantage of function wherever it exists. Hybrid Alternative Driving Systems (HADS) combine characteristics of multiple systems to allow key functions to be assigned to other points of control. HADS can be effective when the user lacks sufficient head control, oral motor function, or cognition to use any one system. They allow us to get the right switch, in the right place, performing the right function, to get the best outcome. This presentation isn't about the end of the head array, it's about effectively implementing existing technologies to create new possibilities!

PS4	**Paper Session 4**			
PS4.1	**Effects of Adjusting Wheelchair Configuration on Ramp Propulsion**	**Intermediate**	**Sarah Bass**	

Manual wheelchair setup is important for efficient wheelchair propulsion. Guidelines suggest setting up the wheelchair to minimize forces by moving the seat more posterior with respect to the rear wheels. When ascending ramps this set up makes the wheelchair more unstable leading to potentially harmful biomechanics. The purpose is to investigate how modifying the fore-aft seat position relative to the rear wheel axle and lengthening the footprint effects ramp propulsion biomechanics. We hypothesize that changing these configurations to increase stability on ramps will decrease the pushrim forces and joint forces on the upper extremities. Ten manual wheelchair users with spinal cord injury will be tested in an ICON manual wheelchair. Seat position and footprint length will be adjusted to one of the following: the most rearward or most forward seat position and the shortest and longest footprint. The wheelchair will be fitted with an instrumented force-torque sensing pushrim. Subjects will be secured to a custom dual belt treadmill embedded into a motion platform where for each configuration, they will propel at either their self-selected speed or target speed for three different inclines: level, 3 and 6 degrees.

PS4.2	**Montana Postural Care Project: A 24-Hour Postural Care Model**	**Advanced**	**Tamara Kittelson-Aldred**	

24-hour postural management has been discussed and developed in the United Kingdom since the 1980s, but is not commonly used in a systematic manner in the United States. While the body of published evidence is limited, clinically this approach seems logical and is used by therapists and families outside North America with some regularity if not consistency in execution to maintain and improve range of motion, body control and function, and body shape/alignment. Clinical experience and evidence available suggests that training and empowerment of families, caregivers and professionals in this area is crucial for success. The Montana Postural Care Project is a pilot program funded by the Montana Council on Developmental Disabilities. The purpose of the program is to introduce 24-hour postural care as a practical approach in this large rural state, while examining results based on findings in the population served. This paper will outline the development of the pilot program including marketing, training, assessment and documentation and follow-up processes.

PS4.3	**Wheelchair Breakdowns and Hospitalizations in People with Spinal Cord Injury**	**Intermediate**	**Nathan Hogaboom**	

For people with spinal cord injuries (SCI), power wheelchairs (PWC) are a means of mobility and pressure management. If a component breaks, there is a risk of adverse consequences. The study objective was to investigate the risk of hospitalization from PWC breakdowns. Methods: 181 PWC users with SCI reported demographics; PWC repairs/consequences within the past 6 months; and hospitalizations within the past 12 months. Consequences were coded into 0 repairs, ≥1 repair and 0 consequences, and ≥1 repair and ≥1 consequence. Logistic regression predicted the odds of being hospitalized at least once, and of being hospitalized from skin disease specifically. Demographics and consequences were predictors. Results: Thirty-one subjects were excluded due to missing data. Of the remaining 140, 83 had breakdowns, 36 reported consequences, and 68 were hospitalized. Participants who reported repairs but no consequences did not have higher odds of hospitalization. Those who reported a consequence had higher odds of hospitalization (OR: 5.2, p<.01), and higher odds of being hospitalized from skin disease (OR: 4.3, p<.01). Discussion: PWC breakdowns that result in injury, being stranded, missing work or school, or missing medical appointments were associated with hospitalizations. Breakdowns significant enough to cause consequences may affect the ability to manage pressure, potentially resulting in skin disease.

PS4.4	**An Ergonomic Comparison of Three Seated Transport Devices**	**Beginner**	**Jefferson Griscavage**	

Healthcare professionals rely heavily on seated transport devices to move patients in clinical settings. However, previous studies have shown that caregivers risk acute and chronic musculoskeletal injury while operating seated transport devices. Recently, a seated transport device has been developed specifically to mitigate operator strain during patient transport. The purpose of this study was to compare differences in operator trunk and upper extremity muscle activity and joint angles when operating an ergonomically designed seated transport device and two others; a standard device and another commercially available device. It was hypothesized that operators would demonstrate less muscle activity and more favorable joint angles while operating the ergonomic device as compared to the other two. Twenty-three experienced healthcare professionals and caregivers performed tasks reflecting common clinical patient transport duties such as level-surface straightaways and turns, ramps, and maneuvering through doorways. Data analysis is ongoing and results will be presented at the conference. If the hypothesis proves correct, applying ergonomic design concepts in seated transport devices will be a validated method to improving functionality while also reducing operator burden. Ultimately it is hoped that implementation of ergonomically designed seated transport devices in hospitals and clinics will reduce incidence of work-related musculoskeletal injuries for operators.

Friday March 3, 2017 - 11:00am to 12:15pm				
IC33	**Introduction of the Total Shear Force Measurement Device, iShear**	**Beginner**	**Max Rogmans**	

Pressure Ulcers are a result of pressure in combination with shear. Pressure can be mapped, local shear measurement is still a problem. Therefore, we've started developing the Total Shear Measurement Device or, iShear in 2010. Total Shear Force (TSF) is the shear force parallel on the seat plane, created by using a backrest or having a certain seating angle. In literature it is often presumed that shear force is more damaging than pressure. The iShear can be used on almost every wheelchair by placing it underneath the cushion of the wheelchair-user. It measures the TSF of the cushion on the body. In combination with pressure mapping (by placing the pressure map between body and cushion) you can measure the impact of a certain posture on TSF. With the iShear you can also measure the ability of a seating system to reduce TSF by translating shear force into normal force. Hereby it's a valuable tool which helps you adapt the wheelchair set-up to reduce the TSF. The TSMD can also be used as an educational tool to show the result of certain postures on TSF. We will show how to install and use the iShear. We will show which wheelchair adaptations are of influence to reduce TSF. Finally, we will show how to use the iShear in combination with a pressure mapping system.

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IC34	**Mobility Addendums; Getting it Right the First Time**	**Intermediate**	**Dan Fedor**	

One of the most frustrating things for a PT / OT is when the patient clearly requires a complex rehab mobility product but they are told that initial documentation provided doesn't justify the medical necessity. This delays the delivery of the necessary product and is inefficient as it requires additional documentation in the form of an addendum to address the missing information. In this interactive workshop the instructor will identify the necessary format and key points that must be present in a wheelchair evaluation for Medicare (and other third party payers) to reimburse for mobility assistive equipment. Participants will have a hands-on experience by reviewing actual wheelchair evaluations then discuss the findings with the group and with the help of the instructor learn what is considered acceptable documentation for commonly used CRT.

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IC35	**Are Environmental Control Units (ECUs) a Thing of the Past?**	**Intermediate**	**Tricia Garven**	

Advances in wireless technologies have changed how consumers with mobility impairments are able to connect with and control their environment. Mobile phones and tablets are now normal in everyday life. This course will explore how consumers can perform electronic ADLs, such as controlling the television, lights, and even thermostat through integrating commercially available smart technologies via direct access solutions, such as the amazon echo, or via their power wheelchair electronics directly. The increasing abundance and popularity of mobile phone applications means a client who may not have the financial means to acquire a stand-alone environmental control unit, can now have much, if not all, of the same access to their environment via their mobile phone. Specific attention will be paid to mobile devices with built in accessibility features, and the complimentary products, to increase or create usability for power wheelchair users who may not be able to 'touch their touch screen'.

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IC36	**Group Wheelchair Skills Training – Setting and Achieving Goals**	**Intermediate**	**Lynn Worobey**	

The number of individuals with spinal cord injury who use manual wheelchairs has grown and unfortunately, many individuals lack the wheelchair mobility skills crucial for negotiating their environment, even with an ultralight wheelchair. As a result, their overall independence, safety and upper limb preservation is compromised due to a lack of wheelchair mobility skills. Unfortunately, due to other confounding issues including shorter length of inpatient stays, limited insurance funding of outpatient visits, and other "sexier" treatment modalities, individualized wheelchair mobility skills training is not a primary focus. As a result, we propose that more efficient methods of teaching these wheelchair mobility skills are essential in both inpatient and outpatient settings. In this presentation, we will discuss the logistics of a group wheelchair skills training as a potential solution to increase individuals' proficiency with wheelchair mobility skills. Our discussion will include the following components: goal setting, scheduling, space and supply needs, group dynamics, wheelchair skills development strategies, and accommodating users with different baseline skill levels. We will present the effectiveness of a multi-site randomized control trial utilizing this intervention and case examples. We will also provide an overview of a pragmatic trial underway to integrate wheelchair skills training into four healthcare systems across the country.

IC37	**School of Power Mobility: Tips for Teaching Power Mobility Skills**	**Intermediate**	**Angie Kiger**	

Independent mobility can have a tremendous impact on the development of areas such as learning, communication, mobility, socialization, recreation, and self-care. Research supports theories surrounding the utilization of power mobility with users of all ages. Innovative technology for power wheelchairs is coming onto the market at lightning fast speeds. Specialty input devices make it possible for individuals to drive with virtually every body part that the individual has the ability to volitionally move. In order for a client to become a successful power wheelchair user all he needs is the proper equipment and set-up, right? Not so fast. When you were learning to drive, did you simply slide behind the wheel of a car and take-off without any training? Hopefully the answer is "no." Instead you most likely participated in some of form driver's education program that required skill development while driving and outside of the car. The primary objective of this session is to provide strategies needed to develop a power mobility training program with curriculum that is exciting and effective for clients. To begin the session considerations for setting-up the environment, communication techniques, and expectations of the entire team will be reviewed. Activity ideas for developing skills while the client is not in a power wheelchair will be presented, followed by curriculum ideas for power mobility training sessions while the client is "behind the wheel".

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IC38	**Driving for Change: Ending Barriers and Paving the Way for Play**	**Intermediate**	**Andrina Sabet**	

The concept of early mobility is gaining traction in the clinical world and in communities around the country. Theory and clinical research demonstrate both the benefits of early power mobility as well as increasing acceptance of this practice. But even if stakeholders are philosophically committed to providing powered mobility access, additional barriers remain in the practical implementation of equipment options that are currently available within the mobility industry. This presentation provides an interactive exploration of these implementation barriers, including equipment design, power access, environmental accessibility, stakeholder perceptions, and multiple layers of gatekeeping. Input from families, children, researchers and clinicians will be utilized in demonstrating an urgent need for change. Break-out brainstorming in small groups will discuss these challenges while creating a foundation for problem solving where solutions can emerge, and be implemented by session participants within their own practice environments. Critical assessment of current barriers combined with out of the box ideas to break down or challenge them is the overarching goal for the session. Participants will come away with practical solutions for promoting a multi-modal mobility approach that is designed to call all explorers off the sidelines.

IC39	**Conquer the Complexity of Writing a Letter of Medical Necessity**	**Beginner**	**Erin Baker**	

Mobility evaluations for complex rehab are challenging, but beyond the evaluation the thought of completing the required paperwork to gain funding for this equipment is overwhelming. Writing a quality letter of medical necessity is an important component to acquiring funding and ultimately to providing appropriate and necessary seating and mobility products to clients. Thankfully, composing a letter of medical necessity does not have to be as time consuming and daunting as one may think. This instructional course is designed to address the common concerns and fears about writing a letter of medical necessity, provide education regarding the components that should be included in a letter of medical necessity, and discuss how to make the writing process efficient and effective. This presentation will also include sample letters of medical necessity and example templates that can be utilized for quick and easy letter of medical necessity creation.

IC40	**New & Emerging Technologies: How to Ask the Right Questions When Evaluating Mobility Devices**	**Intermediate**	**Kendra Betz**	

New technologies that support increased mobility and participation for individuals with physical impairment are consistently developed and introduced to the rehabilitation community. Product innovations capture a wide realm of proposed mobility solutions, ranging from unique ambulation assistive devices, to highly customizable wheeled mobility options and rapidly evolving powered exoskeletons that support individuals who are paralyzed to stand and walk. Within each mobility device category, extensive variability exists. As just one example, manual wheelchairs are available with a multitude of frame designs and features, are built with diverse materials, and are highly customizable by configuration, individualized selection of options and accessories, and interface with complementary mobility enhancing products such as power add-on systems. Often, limited objective evidence is available about the appropriate use and effectiveness of a new mobility device, yet rehabilitation professionals must respond to consumers who believe it is a "must have," to product representatives who promote it as the "greatest invention ever" and to funding sources who insist it is an "unnecessary expense". Many people are challenged to strategically analyze mobility products to differentiate between beneficial attributes and limits of use based on the information available.

The aim of this session is to empower participants to ask the right questions about new and emerging mobility technologies to support an accurate and meaningful assessment of

potential value and identified limitations. Topics will include regulatory requirements, established national and international test standards, impact of published literature, product coding, reimbursement and payment implications, ethical considerations, and objective review of device performance, durability and reliability. Strategies to identify specific clinical indications and contraindications for various mobility options will be discussed and the impact of mobility device failure on consumers will be explored. Participants will develop a framework for objectively evaluating devices to support practical clinical recommendations about new and emerging technologies.

PS5	**Paper Session 5**			
PS5.1	**Second Generation of a Low-Cost Smart Wheelchair**	**Intermediate**	**Carlos Gonçalves**	

During ISS 2015 we presented a prototype of a low cost smart-wheelchair designed to help the rehabilitation professional to select the best functional movement and control strategy to use the device, as well as provide people with severe motor disabilities the opportunity to test a power wheelchair.
This work relied on a power wheelchair adapted with a control unit and sensors to provide multiple inputs and driving aids. This solution needed few electronic components, maintaining its low cost. Wheelchairs with that variability of input or control types are unreachable for the communities in development countries. With this prototype we have already attended 30 patients since 2013 in SARAH Network of Rehabilitation Hospitals with multiple diagnostics (cerebral palsy, traumatic brain injury, spinal cord injury, polio and artrogriposis) and functional movements (head, hand, feet, chin, mouth). The test made with this wheelchair is the first stage of a test-prescribe-adapt process. Our second prototype keeps the features of the previous and extend the use of the device in terms of ergonomics and safety position. Thus, a single wheelchair can be used by children and adults, since its seat and backrest are both adjustable. An electronic adjustable backrest promotes a better suit. With this new device, the tests for a power wheelchair will reach a wider range of patients and they will feel more comfortable and safe, a topic that must be dealt prior any wheelchairs test.

PS5.2	**A Global Description of Wheelchair Service Education**	**Beginner**	**Paula Rushton**	

There are an estimated 70 million people with disabilities who need wheelchairs, 20 million of whom do not have one. In 2008, the World Health Organization (WHO) proposed an 8-step wheelchair service provision model with the goal of providing people with disabilities access to appropriate wheelchair service, regardless of resource setting. One aim of the International Society of Wheelchair Professionals (ISWP) is to raise awareness of and to facilitate the integration of the WHO 8-step model into professional rehabilitation programs around the world. To determine the needs and to inform the development of integration tools, the ISWP conducted a survey to gain an enhanced understanding of the current wheelchair service education provided in professional programs. Seventy-two representatives from educational institutions in 21 countries of different economic standings completed the survey. Wheelchair content was taught in ~79% of represented institutions. However, there is great variability in what and how it is taught and how it is evaluated. The degree of inclusion of wheelchair content related to all 8 steps of the WHO model is variable, thus supporting the need for a more standardized approach. The survey results have informed the development of integration tools to facilitate the use of the WHO 8-step model to guide educational curricula, with the ultimate goal of improving the quality of wheelchair service provision worldwide.

PS5.3	**Development of an Online Wheelchair List for Wheelchair Users**	**Intermediate**	**Anand Mhatre**	

Reports that wheelchairs fail frequently and prematurely in less-resourced settings are likely due to shortcomings in product standardization and regulation in these settings. Higher durability and reliability is needed for wheelchairs used in these settings as they are subjected to unique environmental and use conditions. The standards published by the International Standards Organization (ISO 7176) test wheelchairs for durability, safety and performance but their applicability to products used in the unbuilt environment is unclear. Because of this, wheelchair-related guidelines and reports published by The World Health Organization recommended developing more rigorous durability tests for wheelchairs. This presentation will cover the quality issues reported with wheelchairs in less-resourced settings and the need for developing additional quality standards. The Standards Working Group of International Society of Wheelchair Professionals have recently designed and developed appropriate test methods to address this need. The talk will include these developments and the future work to be conducted by this working group on wheelchair quality standards for less-resourced settings.

PS5.4	**Evaluating the Effectiveness of Hybrid Wheelchair Training**	**Beginner**	**A Yohali Burrola Méndez**	

The International Society of Wheelchair Professionals (ISWP) developed a combined online and in-person training, the Hybrid Training Course, based on the World Health Organization (WHO) Wheelchair Service Training Program - Basic Level (WSTP-B). The purpose of the WSTP-B is to develop the skills and knowledge required by personnel delivering basic level wheelchair services to people with mobility impairments that can sit upright without additional postural support. The WSTP-B is traditionally delivered in 40 hours of in-person training, spread over a five-day period. The Hybrid Training Course proposes an alternative methodology that allocates the knowledge component of the training in online modules and 24 hours of in-person training distributed over a three-day period. In order to test the effectiveness of the Hybrid Training Course, ISWP conducted a pilot in two different locations: India and Mexico. The ISWP Basic Test, which has been psychometrically validated to assess basic level wheelchair knowledge, was administered before and after the course. In addition, participants provided feedback on the Hybrid Training Course via the ISWP Satisfaction Survey. Nonparametric and parametric tests will be used to examine pre/post course wheelchair knowledge and participants' satisfaction. The results of this study are currently being analyzed and will be published in the future.

Friday March 3, 2017 - 1:30pm to 2:45pm

IC41	**CARF Accreditation in Assistive Technology**	**Advanced**	**Dawn Hameline**	

The purpose of CARF accreditation is to promote the quality, value, and optimal outcomes of services through a consultative process and continuous improvement services that center on enhancing the lives of persons served. CARF believes that an organization providing a wide array of employment and community assistive technology services can support persons and families in making informed decisions and choices, thus increasing employment options, independence and community inclusion & interdependence.
This program is designed for those pursuing or considering CARF accreditation in assistive technology supports and services. Participants will gain valuable insight into the accreditation process and strategies to prepare for a survey. It will include:

- an overview of the accreditation process
- an overview of the CARF standards – specifically for Assistive Technology
- Practical examples of conformance to CARF standards
- Do's and Don'ts in preparation for a survey
- what you need to know about ASPIRE

IC42	**Documentation for Complex Rehab Technology: The Ethical Dilemma**	**Intermediate**	**Ann Walker**	

Documentation is critical for the provision of Complex Rehab Technology (CRT). Suppliers work with clinicians who have varying degrees of experience in seating and mobility. This course will discuss the roles of the supplier and the clinician in developing the required information for funding. Some situations require more guidance from the supplier to assist the clinician in developing the information required to justify mobility and seating systems. This presentation will offer effective ways to ensure that the client's needs are being met. Suppliers and clinicians must understand where the line is drawn and who writes the medical necessity.

IC43	**Overcoming Barriers to Best Practice: Keep the Client First!**	**Intermediate**	**Virginia Walls**	

Clinicians and providers are challenged to find their way to 2017 best practice recommendations in an industry where innovations in technology are far outpacing advances in funding. Education on options, choices, and how to navigate the complex CRT and health care environment is an important skill set of the CRT Team. Clients' independence is on the line! Clinicians and providers must understand how to empower their clients with choices of the best rehab technology solutions for clients' long term health, function and participation - as well as to keep their practice current with today's technology that's available. This presentation will apply client case studies on power seat function utilization for pressure injury management, as well as other health, functional activity, and participation goals, to illustrate the steps to best outcomes, including: identifying client needs; identifying technology available to maximize outcomes; understanding evidence about how technology is really used in every-day life; identifying barriers to client access to technology; charting a path to optimal recommendations; and documenting so that individual client's needs are clearly linked with the technology recommended.

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IC44	**Empowering Practice: Evaluating Seating and Mobility Outcomes**	**Intermediate**	**William Miller**	

Given the ever increasing demands for evidence-based therapeutic outcomes, clinicians often grapple with how to effectively evaluate client-centered outcomes of seating and mobility interventions. This session will introduce the use of single-subject research designs (SSRDs) as a way to promote evidence-based evaluation of outcomes through a clinically oriented yet rigorous approach that allows clinicians to quantitatively evaluate and validate outcomes within their everyday practice. SSRDs utilize repeated measurements to study a client's individual responses to the systematic application and sometimes withdrawal of an intervention. In this manner, SSRDs not only accommodate specific client-related factors but allow these factors to become part of the outcome assessment process. Additionally, data analysis within SSRDs ranges from use of visual methods that require little to no arithmetical calculations to use of select straightforward statistical procedures. Finally, SSRDs offer clinicians a viable and effective way to contribute to research within the confines of a busy clinical practice. Attendees are encouraged to bring clinical questions from their own practice to the session so that they can initiate the process of planning a SSRD to validate their seating and mobility practices.

IC45	**Seeing Opportunities for Success: Visual Factors for Positioning**	**Intermediate**	**Katherine Clark**	

Functional vision plays a crucial role in successful setup and use of adaptive equipment for seating, positioning, and mobility. Visual assessment is a key component of the equipment evaluation, particularly for patients with a history of neurological impairment and/or complex physical needs. Given the high incidence of cortical visual impairment (CVI) and visual processing delays among this population, understanding functional vision can dramatically alter the setup of positioning systems. It is crucial that evaluators recognize characteristic behaviors of CVI. Modifications, supports, and setup considerations can result in significant changes in a patient's ability to tolerate and function within a positioning system. This presentation will define CVI and review the characteristic visual behaviors, identify barriers within the environment or in the setup of a positioning or mobility system, and provide case examples of supports chosen within positioning systems which support functional vision and successful use of adaptive equipment.

IC46	**Assessing Mobility for Those with Cortical Visual Impairment**	**Intermediate**	**Cindi Petito**	

Approximately 40-50% of the brain is involved in vision and 20-40% of individuals who have sustained a brain injury have some degree of visual impairments. This presentation will review factors related to vision that may impact a client's ability to successfully utilize a seating and mobility device with a focus on cortical visual impairment (CVI). Cortical visual impairment, also referred to cerebral visual impairment, is a visual impairment resulting from some type of brain injury. Children and adults who have CVI have visual function deficits, but have normal eye exams with no apparent abnormalities in the structure of the eye or optic nerve. Therefore, the visual deficits seen with CVI are the result of interference in the visual processing centers and visual pathways of the brain. CVI is the most common cause of visual impairment in children in the U.S. Evaluating and recommending a proper seating system for a child with CVI can be complex depending on the diagnosis related to their physical and neurological impairments. CVI impacts postural patterns and head positions since the child will often move in their seating system simply to gain their visual field or preferred area of vision. This session will discuss how to assess manual and power mobility needs for those with CVI.

IC47	**Solving Complex Seating Clinic Challenges in an Intense Climate**	**Intermediate**	**Meredith Budai**	

The seating climate is more intense. Patients continue to come to clinic with complex needs, requiring creative mobility solutions used within the bounds of strict reimbursement rules and good seating practice. This session reviews challenging patient cases, detailing the problems seating clinics face and solutions. For example, one scenario describes a patient who presented to clinic with a new wheelchair described as an "impulse buy," funded by her insurance. She no longer likes this wheelchair and is limited as her provider does not service this product. Another patient with paraplegia used a manual wheelchair since onset of injury. Over time she developed upper extremity injury requiring use of a power wheelchair. One other patient is ambulatory in her household but requires use of a wheelchair in the community to prevent from sustaining a serious injury. Additional case examples highlight what happens when a patient's current seating system no longer meets their needs, but replacement or modification is limited by their insurance benefit. We will provide practical solutions and insight from our experiences to best meet patients' seating needs including insurance reimbursement and documentation requirements, reliable outcome measures to justify recommendations (including outside of the home), and the necessary patient/caregiver education which is required to successfully aide patients with unique seating situations in an intense climate.				
IC48	**Rehab Engineers + 3D Printing + Electronics = Personalized AT**	**Beginner**	**Ben Salatin**	
During the last 6 years, clinical rehabilitation engineers have become part of the US Dept of Veterans Affairs rehabilitation team at a few hospitals. These rehabilitation engineers use technical skills and in-depth knowledge of assistive technology to complement the diverse group of specialists within the rehabilitation team. This is typically seen in the evaluation for and prescription of assistive technology during co-treatment with rehabilitation therapists. Through technical skills in 3D printing and custom electronics these rehabilitation engineers have been able to provide a new level of personalized assistive technology to the Veterans they serve. This session will give participants an overview of a clinical rehabilitation engineer's role within a VA rehabilitation clinic, a basic understanding of the process used to create 3D printed devices and custom electronics and provide clinical examples of these technologies related to seating and mobility. Emphasis will be placed on the unique fabrication capabilities that a clinical rehabilitation engineer can bring to a rehabilitation team. Resources will also be presented showing participants how to access these technologies on their own. Participants will be able to get hands-on with the clinical examples discussed, try out various 3D modeling software, a 3D scanner, simple electronic programing software, and see a 3D printer in action.				
PS6	**Paper Session 6**			
PS6.1	**Modeling Pressure Injury Conditions Caused by Toilet Seats**	**Intermediate**	**Amit Gefen**	
Pressure injury (ulcer) prevention needs to consider all the aspects of daily lives of clients and every possible interaction of their weight-bearing body sites with support surfaces. The most poorly studied body-support interaction is that of the buttocks with toilet seats, where there is no published information on resulting tissue deformations. The extent of exposure to sustained tissue deformations is now known to be correlated to the risk for developing deep tissue injuries - the pathway for the most serious pressure injuries. Tissue deformations in muscle, fat and skin are typically high (primarily in shear) on toilet seats compared to chairs. Specifically, the effective area for load transfer is smaller for toilet seats; they are often made of rigid plastic (if not cushioned), and their shapes are not designed to optimize tissue loads and can include sharp angles, edges and other structural gradients that highly distort tissues. Using finite element computer simulations we have studied sitting on multiple toilet seats and have quantified resulting skin, fat and muscle tissue deformations. As expected, tissue deformations are greater on toilets relative to chairs. Moreover, the toilet-seat design, i.e. the support-surface widths and their inclinations strongly affect tissue loads. Computer modeling can effectively rate toilet seat designs by the potential tissue-injury risk, and regardless, toilet sitting time should be minimized for all at-risk populations.				
PS6.2	**An MRI Investigation Evaluating Tissue Response to Seat Cushions**	**Intermediate**	**David Brienza**	

Tissue response plays a role in the development of pressure injuries. Skin protection cushion efficacy has been demonstrated. Choosing between the many varieties of cushions to best meet a specific patient's needs remains a challenge. While pressure mapping can measure superficial loading, pressure induced injuries show evidence of deep tissue injury. The impact on deeper tissues should be considered when evaluating and selecting a cushion. A recent study challenged the assumptions about the anatomy of people with SCI, suggesting that research in this field cannot be advanced without carefully examining the 3D seated anatomy. The study showed that tissue displacement can be important when looking at risk, and more research is needed. This study is the first 3D analysis-based comparison of ischial tissue response for a variety of wheelchair cushions. MRI examinations were conducted and 3D models created for 6 individuals (4 with SCI). Tissue composition under the ITs was very consistent amongst all of the participants with SCI; all 4 sat on mostly fat, with a maximum of 7% muscle. The anatomical feature that was seen in all of the participants with SCI was muscle displaced laterally when loaded. Since all of the participants with SCI had similar loaded tissue composition, the amount of tissue under the ITs can be used to visually assess loaded tissue conditions. No one cushion consistently had better results, stressing the importance of personalized cushion selection.

PS6.3	**How a Cushion Can Effectively Protect Against Pressure Injury**	**Intermediate**	**Amit Gefen**	

This talk discusses the fundamental considerations in making an adequate selection of a cushion for either wheelchair users or chronic sitting needs. Using MRI coupled with finite element computer modeling, sufficient immersion and envelopment of the body were identified as key factors, which together represent the potential cushioning performance through minimization of internal tissue deformations, strains and stresses. Adjustability of the cushion is a key to achieving this end, as body types vary considerably among people, and can change substantially over time, especially given the remarkable disuse-related anatomical and physiological changes during months and years of chronic sitting. Adaptability is another key factor, as the cushion has to be able to accommodate changes in posture and weight shifts associated with daily living throughout the entire period of intended use. Furthermore, with regard to durability, the cushion should maintain its physical and mechanical properties as well as its performance over several years, despite exposure to degenerating conditions e.g. temperature changes, wear against materials and exposure to body fluids. Given the recent advancements in understanding the etiology of pressure injuries and the availability of novel tools and research methodologies to assess cushion efficacies, there are still considerable gaps between public policy and current practice in cushion evaluation, and the challenges and measures that should be applied.

PS6.4	**Factors Affecting Seating Prescription: An Evaluation of Watercell® Technology in Complex Static Chairs**	**Intermediate**	**Carol Bartley**	

This paper will highlight important factors practitioners should consider when prescribing seating for people who sit for extended periods of time (comfort, pressure redistribution, aesthetics, function, posture, occupation, support and end user collaboration). These factors are based upon a mixed methods study that evaluated the pressure redistributing effects of WaterCell® technology in specialist seating. Average and peak pressures were then compared to self-reported discomfort scores, physiological observations, and semi structured interviews of twelve participants (five male, seven female).

Friday March 3, 2017 - 3:00pm to 4:15pm				
IC49	**Custom Molded Seating: Back to the Basics**	**Beginner**	**Jill Sparacio**	

Custom molded seating components are viewed as a last resort for individuals with postural needs. It is viewed as too time consuming or "not worth the money". However, it can provide simple solutions to common frustrating problems. The labor and skill needed for success can be intimidating, making clinicians and suppliers hesitant to consider custom molding as a first choice. There are many custom molded seating manufacturers to choose from. Each has specific techniques and procedures, there are many commonalities when capturing a shape. The molding process should be a simple process that can be easily completed. Once the decision is made, success is achieved with the development of a plan, assignment of roles and frequent re-assessment during the shape capture process; transfer of information from the mold to the manufacturer, making sure that the desired features are properly communicated; and the use of an educated eye to ensure that the seating goals have been met. Through lecture, case studies and reflection, this session will address the "how-to's" of the custom molding from the setup to fitting. Discussion will include how to interpret clinical findings and translate them into recommendations; the importance of contour and contact as well as how to gain it; and how to identify if goals are achieved in the final fitting process. Consumers with minimal asymmetries as well as significant postural asymmetries will be discussed, demonstrating a variety of uses.

IC50	**Power Adjustable Seat Height is Both Reasonable and Necessary!**	**Intermediate**	**Julie Piriano**	

There is a misconception that the provision of power adjustable seat height (aka power seat elevation) is not covered by third party payors, which is inaccurate. Many third party payors that implement a prior authorization process will consider this technology on a case-by-case basis and are looking to assure that the medical need for the power seat function has been documented. This course will examine the clinical benefits and current research in support of a power height adjustable seat feature, provide the clinician with practical tools to consider and incorporate when evaluating and documenting the need for this power seat option and assist the supplier in reading and interpreting the information in the medical record to determine when to provide a power seat elevation system.

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IC51	**Advanced Mobility Skills Training for Manual Wheelchair Users**	**Intermediate**	**Kendra Betz**	

Individuals who use manual wheelchairs as a primary means of mobility require comprehensive clinical education and training to support mastery of advanced mobility skills for life participation. Acquisition of wheeled mobility skills supports maximized independence, safety and quality of life. Specific education and skills training can decrease the risk of injury while optimizing functional skills which ultimately supports the manual wheelchair user to lead a healthy, active and productive lifestyle. Critical education and training for manual wheelchair users includes wheelchair configuration recommendations, mobility progression from basic propulsion to advanced skills in varied environments, transfer techniques, wheelchair management such as stowing in a vehicle, travel and equipment maintenance. Too often, many of these critical education topics are neglected when manual wheelchairs are provided to either novice or experienced wheelers. The aim of this session is to empower rehabilitation professionals to understand and provide comprehensive skills training critical for all manual wheelchair users. Guidance will be offered for efficient education methods and practical training techniques. Case examples with photos and video will be utilized to demonstrate key points.

IC52	**Meeting the Unmet Need: Encouraging and Educating Therapists**	**Intermediate**	**Amber Ward**	

Seating and wheeled mobility can touch every area of OT/PT practice from pediatrics to geriatrics and every type of disability. Since mobility directly relates to all areas of daily function it is critical that OT and PT practitioners understand seating and wheeled mobility concepts which will allow for optimal functionality and independence of clients. The management, training, evaluation and provision of seating and wheeled mobility is a natural fit for the OT and PT. Due to lack of knowledge, time and other constraints, it is sometimes difficult for therapists to pursue further skills in the area of seating and wheeled mobility. Yet, there is a significant unmet public need for therapists experienced in seating and wheeled mobility to perform evaluations, training and product selection to guide consumers. This presentation will focus on how each seating professional (supplier, ATP, manufacturer, seating therapist) can get involved in promoting the need for knowledge and experience, as well as generating excitement to assist clients in this area. Participants will be provided with potential options for educational opportunities, job shadowing and fieldwork, experiential learning, teaming with educators and healthcare centers, and other options for training of therapists. We will offer novel approaches to train OTs and PTs in this important field of practice, and how all service provider team members can assist therapists in learning skills and competency in this area.

IC53	**Seating the 'Unseatable'**	**Intermediate**	**Stefanie Laurence**	

Ever have the sinking feeling when you meet the client that you have absolutely no idea where to start? Every client presents with their own unique issues; some are physical, some are behavioral, some are environment related. A good outcome for a prescription takes all factors into consideration and strikes a balance to accommodate as many issues as possible. The core tenants of best practice in prescription of a seating and mobility system are assessment, goal setting, matching client need to equipment parameters, evaluation and follow-up. Through the use of case studies, this session will highlight the best practice, problem-solving path as it applies to any client; those that appear straight-forward, complex or 'unseatable', whatever the reason.

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IC54	**To Abduct or Not Abduct: That is the Question**	**Advanced**	**Ginny Paleg**	

Low level research supports 60 degrees of abduction in standing and lower amounts for sitting and lying. In a debate forum (complete with a judge) leading experts will debate the benefits and risks of 0-60 degrees of abduction. In the end the will make specific clinical recommendations as to the amount of abduction based on best clinical evidence for standing, sitting and lying for children with cerebral palsy. Sunny Hill Therapists Ros Livingstone and Lynore Mcclean will argue for moderation, Ginny Paleg will argue for the 60 degrees supported in the evidence, Tom Hetzel will be the judge.

IC55	**Adaptive Bathroom Equipment for Adults**	**Intermediate**	**Elaina Halkiotis**	

Bathing and toiling are vital mobility-related activities of daily living (MRADL). These MRADLs are often not addressed in seating and mobility clinics due to: lack of funding; an assumption that funding will not be available; the inability of the wheelchair clinic therapist clinician to visit the home; a lack of communication and/or coordination with home visiting therapists. Clinicians are responsible for providing recommendations on how clients with mobility impairments can best perform toileting and bathing. This includes the ability to evaluate the home environment in general and the bathroom in particular, specify a product that meets the seating and positioning needs of the client, while enabling them to participate in these activities to the fullest extent possible. This presentation is intended to educate clinicians and suppliers on how to allow clients to access their bathroom through the application of various shower, bath, and commode chairs, as well as how to maximize postural support, skin protection, and positioning during these MRADLs.

IC56	**An Online Wheelchair Maintenance Training Program for Clinicians**	**Beginner**	**Sara Múnera**	

Wheelchairs positively impact the level of independence and participation of people with disabilities. However, wheelchair breakdowns can negatively impact the user's life. Research has shown an increase in wheelchair users reporting the need to repair their wheelchair in a 6-month period, from 44.8% in 2009 to more than 60% in 2014. Furthermore, greater than 30% of wheelchair users reported at least one adverse consequence secondary to breakdown –such as being injured or stranded, and reducing mobility and quality of life. When maintenance is performed, the number of accidents and injuries for wheelchair users are reduced. An in-person wheelchair maintenance training program (WMTP) which utilizes a train-the-trainer model to educate clinicians on how to perform maintenance was developed. The WMTP was found useful, relevant, understandable, and enjoyable by participants. To increase the accessibility, we have converted the WMTP to an online course that clinicians could access from anywhere remotely. Online training has similar outcomes when compared to traditional learning and can be superior in terms of knowledge and skills gained. Interactivity, practice exercises, and peer and mentor feedback, are used on the training program to improve learning outcomes in participants. The goal of this instructional course is to introduce clinicians to the online training program that may help them teach wheelchair users how to maintain their wheelchairs.

PS7	**Paper Session 7**			
PS7.1	**Interrater Reliability of the Wheelchair Components Questionnaire**	**Intermediate**	**Karen Rispin**	

Wheelchair provision in low-resource areas presents challenges to wheelchair durability and appropriate seating. For durability, these include price constraints, use on rough surfaces outdoors, and limited maintenance opportunities. For appropriate seating, difficulties include a narrow selection of wheelchair types and limited access to wheelchair training for clinicians. Without data on durability and appropriateness, it is difficult to address challenges in a cost effective way. The Wheelchair Components Questionnaires (WCQ) ask clinicians to rate components of a wheelchair for maintenance condition (WCQc) or appropriateness to the user (WCQa). An Intra-Class Correlation score of above 0.7 would be accepted as an indication of reliability. Two physical therapists evaluated 46 wheelchairs and their users (19F, 27M, mean age 11.15 ± 1.76) at a boarding school for students with disabilities in a low resource setting. Study protocol was approved by the authors' university and the organizations involved. For each questionnaire the intra-class correlation coefficient (ICC) of the mean scores for each rater was completed. For the WCQa an ICC score of 0.55 indicated less than ideal reliability, however it was not surprising that ratings for appropriateness would vary between raters due to different reference frames. For the WCQc an ICC score of 0.82 indicated good reliability, confirming that this questionnaire is a reliable tool for assessing wheelchair condition.

PS7.2	Proper Wheelchair Measurement and Fit	Beginner	Rachel Arata-Maiers	

According to the most recent report conducted by the U.S. Census Bureau, over 3.6 million Americans over the age of 15 years have used a wheelchair. The need for impaired mobility and wheeled accessibility is growing, however, individuals are frequently placed in inadequate seating positions and devices. Accurate measurement and fit are crucial to improving functional performance. Proper seating ergonomics have been studied to determine normal body mechanics for comfort and prophylactic care of individuals. Many research studies have being conducted to provide wheelchair users with safe and functional devices for mobility and accessibility; however, individuals are frequently placed in incompatible chairs causing pain and dysfunction after repeated use. Although precise measurement and fit are essential, proper seat position and propulsion patterns are also fundamental to safe mobility and functional performance. This paper summarizes research targeted at optimizing appropriate body mechanics and ergonomics to provide safe and functional mobility.

PS7.3	Wheelchair Skills Training: University Course vs. Boot Camp	Beginner	Paula Rushton	

In Canada, occupational therapy (OT) students received limited wheelchair (WC) skills training. Some OT programs offer extracurricular WC skills training education in the form of a short intensive boot camp. These boot camps, based on the Wheelchair Skills Program, have improved WC skills and confidence. For programs that offer this content within the curriculum (e.g. a one-semester course), an alternative approach could be to offer the training in short frequent sessions over a longer duration. This study compared the effectiveness of a boot camp vs. a university course approach for WC skills training to OT students. The experimental group (n=31) took a 15-week, 45-hour WC provision course which included WC skills training throughout. The control group (n=28) attended an 8-hour WC skills boot camp. Compared to baseline, the WC skills and confidence of both groups improved significantly. The experimental group showed a trend towards increased WC confidence, while the control group improved more in WC skills. In terms of confidence to test, train spot, and document WC skills, the experimental group demonstrated greater improvement in documentation. This study provides insights on the effectiveness of two approaches to WC skills training. One limitation of this study is that students may have overestimated their WC skills and confidence given their limited experience. Future study should objectively assess WC skills and their retention over time.

PS7.4	Reliability of the Wheelchair Mobility Protocol	Intermediate	Karen Rispin	

The Aspects of Wheelchair Mobility Protocol (AWMP) used in a repeated measures format was developed to provide comparative effectiveness data on the mobility provided by different wheelchair types in key rolling environments. AWMP collects objective quantitative and qualitative data pertaining to the ease of rolling on different surfaces. The purpose of this study was to complete test re-test reliability validation with an Intra-class Correlation Coefficient value of 0.8 indicating good reliability. Study protocol was approved by the authors' university and all organizations involved. Sixty wheelchair users (27M, 23F, mean age 17.3 ± 1.75) were invited to participate at a boarding school for children with disabilities in a low-resource setting. Fifty were able to complete the protocol twice in their own wheelchairs with the second iteration at least five days after the first. No data was collected for ten participants who were unable to self-propel. Participants rolled for four minutes on measured tracks in each of the following rolling environments: rough ground, smooth ground, tight spaces, and up and down a low curb. Distance traveled was recorded. Participants completed visual analogue scale (VAS) questions, rating the difficulty of each track and also provided an explanatory comment. ICC values of 0.966 for distance traveled and 0.801 for the VAS scores from participant response questions confirm the reliability of the AWMP.

Friday March 3, 2017 - 4:30pm to 5:45pm				
IC57	**The Seating Clinic: Business Realities for Success**	**Intermediate**	**Theresa Berner**	
The funding for complex medical equipment requires a continuous adjustment to changing policies. Collaboration with a team approach is the best strategy to assure success and reduce chances for denials and appeals. Working as a team comes naturally to clinicians in rehabilitation. Seating clinic teams involve not only the medical facility staff but also outside partners such as the complex rehabilitation supplier and often the manufacturer. Each player brings a unique set of skills to the team and allows the patient to gain multiple perspectives when making decisions about equipment. This course will carefully outline the roles and responsibilities of each team member to identify the strength of the team. The course will also discuss and define multiple structures of how to set up a team environment so multiple continuum of care can be showcased. The importance of the team and structure would not be successful if the clinician is not getting reimbursed for their time. Therefore structure and examples of billing models and treatment plans surrounding wheelchair clinic service delivery will be showcased. Clinicians routinely deliver services as a part of an inpatient and outpatient team with no concern of reimbursement, this course will correlate how seating clinics should not be any different. By the end of the course the audience will have several examples and options of how to develop a team to serve patients through a structured seating clinic model.				
IC58	**A Memorial to our Colleagues Who Have Passed**	**Non-CEU Course**	**Gerry Dickerson**	
IC59	**Integration of Powered Mobility, AAC, & Computer**	**Advanced**	**Karen Kangas**	
Powered chairs and augmentative communication systems, and computer access need to work together. These systems can be integrated, but, frequently are NOT. We will share how to configure the electronics and hardware to allow integration with AAC and computer access; and strategies needed for teaching this integration with specific individuals. Today students are "fit" with multiple pieces of equipment for assistive technology. However, these two primary systems, those for mobility and those for communication (using a powered chair and an augmentative communication device and/or access and use of a computer) frequently do not co-exist, much less work together. We will share how to integrate powered chairs and communication devices and computers. Integration includes the physical configurations of these devices: how they work together, how they are literally "hooked up," how they are compatible, and how they actually work. The second part of the "integration" will be sharing strategies of teaching and implementing the use of these integrated systems, with specific case studies. We will share the types of powered chairs available, the types of programmable electronics available, the equipment used, the equipment needed, and how the configuration is necessary for both mobility and communication systems to work together. *This session is supported by a company with reported interest in the sale of Assistive Technology products. The content has been reviewed by ISS personnel and determined to be appropriate for continuing education purposes.*				
IC60	**Ideas to Innovation: Student Design Projects and Capstone Projects**	**Intermediate**	**Mark Warner**	
The purpose of this workshop is to provide an overview of Capstone Design Programs, and provide information to non-academic clinicians and suppliers on how they can leverage their real-world experience to train the next generation of engineers and clinicians, while developing prototype designs that can improve the quality of life of individuals with disabilities. The authors will provide case studies from the University of Pittsburgh and The Ohio State University, with a Clinician's input on identifying the opportunities, pitfalls and overall realities of working with an academic program.				
IC61	**Comparative Effectiveness Research: A Conceptual Model in Wheelchair Service Provision**	**Intermediate**	**Deepan Kamaraj**	

With increasing awareness regarding Evidence-based practices, along with the introduction of policies and laws at the institutional and national levels that necessitates stringent record of interventions and their outcomes; the need for studies that evaluate effectiveness is on the rise. This increasing need has led to the new branch of science called the Comparative Effectiveness Research (CER). The Affordable Care Act defined CER as ''research evaluating and comparing health outcomes and the clinical effectiveness, risks, and benefits of 2 or more health care interventions, protocols for treatment, care management, and delivery . . . and any other strategies or items being used in the treatment, management, and diagnosis of, or prevention of illness or injury in, individuals.''(Hartling, Vandermeer, & Fernandes, 2014) The primary purpose of CER is to assist various stakeholders of the health care delivery process in making informed decisions by advancing the quality and relevance of evidence available(Krishnan, Schatz, & Apter, 2011). This instructional course will discuss literature explaining Comparative Effectiveness Research within the realm of Assistive Technology, and present a conceptual framework that would be applicable for the various stakeholders of the wheelchair service provision (America, 2011). The goal of this session is to present and discuss useful outcome measures that could be employed by clinicians and other stake holders to evaluate effectiveness during the process of wheelchair service provision.

IC62	**Evaluation of Saddle Seating for Children with Special Needs**	**Intermediate**	**Sharon Sutherland**	

Seating problems in children with movement disorders requires individual adjustment, careful choice of device, trial and adaptation to the child's needs.
Non-functional position can be: Pelvis tilted backward, hips adducted, feet placed in front of the knees, thoracic spine with an increased kyphosis and cervical spine with an increased lordosis, head not in midline , trunk asymmetrical, arms affected by pathological patterns.
Research has shown that a functionally active sitting position is created by neutral pelvis and open hip angle, slightly abducted hips, feet positioned under or just behind the knee, trunk in a good posture and free to move in different directions.
In our experience the Posture and Postural Ability Scale (PPAS) is useful for comparing seating postures created by different chairs and saddle seats.
In the seminar, we will show case studies where the PPAS is used to compare traditional seating versus saddle seating.
Over the years, we have personally observed and evaluated many children for their seating and positioning needs. We firmly believe that in the absence of respecting the hips, many children are presenting in their more traditional type seating with compromised postures leading to respiratory and GI complications. Saddle seating is an excellent alternative type seating that can help us to "take the work out of sitting" for some of these children.

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IC63	**Running a Seating Clinic 102: Going Beyond the Basics**	**Intermediate**	**Ashley Williams**	

With increasing cuts in funding and increased productivity demands on therapists, many seating clinics are closing. However, seating clinics continue to be successful in many different environments servicing clients of different ages and diagnoses. To be successful, therapists and suppliers must work closely together and be educated in funding, proper documentation, and have appropriate relationships with manufacturers' representatives. This presentation will give insight to the various types of seating clinics and how to make them successful. The presenters will include an experienced team including a seating therapist, a supplier, and a manufacturers' representative. All aspects of a successful clinic will be discussed. These include the appropriate length of time for equipment evaluation; the importance of equipment delivery at the clinic where it was prescribed; the CPT codes that can be billed by the therapist for successful payment of services for the clinic; and the minimal amount of mobility equipment a clinic needs to have for successful evaluations. Case studies and examples will be used to show how a well-run clinic functions and the problems that can occur with other provision methods.

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IC64	**Colombian Wheelchair Sector: People, Policy, Products, and Provision**	**Beginner**	**Sara Munera**	

Colombia is an upper middle-income country located in South America. With a population of 49 million, the longest civil war in the Americas and a rapidly aging country, it is expected to have a high prevalence of people requiring a wheelchair for their mobility. With regards to the policies, it ratified the Convention on the Rights of Persons with Disabilities in 2011, but wheelchairs are excluded from health insurance coverage. Since not having access to a wheelchair is a human rights violation, there is a legal mechanism via a court appeal where people can have access to the prescribed wheelchair funded through the government. For citizens in the lowest income bracket, there are subsides through the government to receive a wheelchair once a year. This implies that some people may have more than one wheelchair, likely an inappropriate one, while many are still waiting for one. In recent years there has been an influx of high-end imported wheelchairs products and cushions, but many still receive hospital-style wheelchairs without a cushion. In addition, there is a lack of nation-wide wheelchair provision guidelines, with some users receiving wheelchairs "off the shelf" and many not receiving training on how to use the wheelchair or maintenance and repairs services. There is a need to advocate for the regulation of the wheelchair sector in the country to warrantee equal access to appropriate wheelchair products and services to the users that need them.

PS8	**Paper Session 8**			
PS8.1	**System Requirements for Continuous Seat Pressure Mapping**	**Intermediate**	**Tamara Vos-Draper**	

Even with careful adherence to skin heath recommendations, wheelchair users still experience pressure ulcers from seat cushion failures, inadequate equipment, and suboptimal positioning strategies. A personal-use pressure mapping system may provide wheelchair users essential compensatory feedback to better protect their skin. To realize such a personal-use system, it is critical to have a pressure sensing mat with adequate accuracy and repeatability over month long collection periods. Our prototype mapping system demonstrated the safety and feasibility of daily field use by wheelchair users with spinal cord injury, but sensor performance under daily, continuous loading is still undefined. The objective of this paper presentation is to report results of experiments that tested long-term and field-based system performance by (a) characterizing the accuracy of pressure measurement in regards to the drift behavior of the pressure mat, determining if a drift correction factor is necessary, and defining the necessary calibration frequency; and (b) determining if pressure distribution measurements are repeatable during daily use over a month long period. Preliminary results indicate improved bench-top accuracy with monthly calibrations of the pressure mat and adequate repeatability over a month long collection period with able-bodied participants for specific measures. Results also provide important requirements for effective continuous pressure map use in real world environments.

PS8.2	**RCT on Wheeled Mobility for Pressure Injury Prevention**	**Intermediate**	**David Brienza**	

Pressure injuries (ulcers) are a significant healthcare problem for nursing home residents. An RCT on the efficacy of skin protection cushions showed that the cushion used with an individually-configured wheelchair significant reduced pressure injuries. The study led to the question of whether the wheelchair has an effect. An RCT was performed to assess whether individually-configured, lightweight manual wheelchairs lower pressure injury. The secondary aim was to determine the impact on function. Nursing home residents were randomized to a facility wheelchair (n=131) or individually-configured wheelchair (n=127). The participants were monitored weekly for 26 weeks or endpoint. Function was measured with functioning every day in a Wheelchair Capacity (FEW-C), Wheelchair Skill Test (WST), and Nursing Home Life Space Diameter (NHLSD). Thirty-four developed pressure injuries, 19 in the treatment group and 15 in the control (p=0.77). The change in function scores between pre-randomization, 2 weeks and endpoint were compared. Significant differences were observed for change in FEW-C independence scores between pre-rand and endpoint (p = 0.03), and change in FEW-C safety scores between pre-rand and endpoint (p = 0.05). NHLSD scores increased for the treatment group and decreased for the control group, but differences in means and change in score over time were not significant (p=0.07). Though WST scores were not significantly different, scores were greater for the treatment group.

PS8.3	**Design and Verification of a Paediatric Wheelchair Cushion**	**Beginner**	**Maighread Ireland**	

A literature review has highlighted the danger of extrapolating adult data for design of paediatric support services. Paediatric body dimensions, biomechanical properties and daily activities are different to adults; hence for design purposes, a child cannot be considered as a scaled-down adult. This study involved the design, verification and validation of a paediatric wheelchair cushion, based specifically on paediatric requirements and dimensions.
The design specification was determined from a questionnaire to X clinicians and product advisors in wheelchair and seating services. Feedback highlighted the need for adjustable deep-contouring to provide stability, optimize pressure distribution, adapt to growth and accommodate deformity. Prototypes were assembled and designs verified using a rigid cushion loading indentor (RCLI) and pressure map. The RCLI has been proven to differentiate wheelchair cushion performance. By using anthropometric data, a paediatric version (PRCLI) was manufactured according to ISO 16840-2:20075, to approximate the anatomy of a ten-year old. XSensor® pressure map readings were taken following ISO 16840-9:2015. Final designs were validated through clinical pressure mapping of children and further feedback from clinicians. The PRCLI enabled objective decision making during the design process, thus increasing the safety, quality and reliability of the design. This methodology may inform and advance clinical effectiveness of cushion selection.

PS8.4	**Simulating Terrain for Measuring Wheelchair Rolling Resistance**	**Intermediate**	**Patrick Barba**	

While ease-of-function in various terrains is important for wheelchair users in modern nations, for those in less resourced environments it can be a life threatening concern. In locations with rough pavement, dirt paths, and few smooth sidewalks, the difficulty of rolling causes physical exertion that can either compromise the user's health or cause them to avoid traveling outside their home. One aspect of wheelchair function is the rolling resistance of the wheels. Different types and sizes of wheels roll more easily over different surfaces. There are commercial methods of measuring rolling resistance of common bicycle and automobile wheels assuming a smooth surface. However measuring wheel characteristics over such surfaces as brick pavers and grass paths is problematic. The authors developed an instrumented three-wheeled cart and measured the force required to pull the cart over different surfaces at a constant velocity. By using the same wheels at with the same loading, they were able to identify simple surfaces that would simulate the complex terrains of local environment. This will allow manufacturer's to compare wheel/tire combinations based on rolling performance, not just on smooth floors, but on natural terrain.

Saturday March 4, 2017 - 8:00am to 9:15am

IC65	**Maximizing Outcomes in Step with Advancing Technology**	**Intermediate**	**Amy Morgan**	

Seating and wheeled mobility technology is advancing rapidly, and it may seem difficult to keep up with the many options that are available for wheelchair users. Often, a wheelchair user is instructed in a basic level use of their equipment at delivery and the more advanced features that their chair is capable of are not utilized. It is nearly impossible for a single provider to thoroughly apply appropriate technology for various aspects of someone's lifestyle and medical needs; a team approach is critical to thoroughly maximize a person's ability to utilize comprehensive assistive technology options. This workshop will use recent case studies to examine solutions to problems we commonly encounter in real world applications. A practical framework to implement best practice as recommended by the RESNA Wheelchair Service Provision Guide will be shared as well.

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IC66	**Air Travel with a Wheelchair: What Seating Experts Should Know**	**Intermediate**	**Jessica Pedersen**	

Airline travel provides a means to traverse the globe for business or pleasure. This session will focus specifically on individuals who use a wheelchair and the airline travel process including making a reservation, navigating an airport and security, boarding the aircraft, sitting on the aircraft seat, and stowage of the wheelchair. When making reservations, disclosure of a disability and specific equipment being used will help the service providers at the airport and airlines to assist with the person and the wheelchair. Due to the narrowness of the aircraft aisles, a boarding chair is needed to access most aircrafts and the aircraft seat. Boarding devices vary and it is necessary for the passenger to communicate with the service providers to assure the correct device is available for their travel. During transit, individuals may need to use other assistive technologies to help with sitting tolerance, skin protection, and posture. Once a traveler lands at their destination, the biggest concern is what type of condition the wheelchair will be in. Due to the different types of stowage openings on various aircrafts and different airline personnel at the destination airport, it is essential for the individual in a wheelchair to be able to direct airline personnel on strategies to protect the wheelchair and what to do if there is damage or loss. This session is intended to provide a solid foundation to assist clients with successful airline travel.

IC67	**Solution to Complex Drive Systems with the ALS Population**	**Intermediate**	**Pam Glazener**	

Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease, is a progressive neurodegenerative disease involving loss of both upper and lower motor neurons resulting in limb muscle weakness, muscle atrophy, speech and swallowing difficulties and respiratory compromise. The progression of symptoms can be rapid, average, or slow. The management of patients with ALS has changed and improved dramatically in the past 20 years. Power mobility plays a large role in the current care and quality of life for these patients. When choosing the appropriate power mobility device the drive control needs to be carefully evaluated and chosen based on the patient's abilities, disabilities, rate of disease progression, and anticipated changes in the future. Several patients with ALS will be presented in this course - each presenting with varied symptoms, level of function, abilities and rate of progression. Specifics regarding nontraditional complex drive systems and the required modifications for the different stages of ALS will be discussed. This course will also include justification guidelines to assist with documentation for these specialized drive control systems which can be a challenge for this patient population.

IC68	Research & Evidence-Based Practice for Pressure Management and Tissue Integrity	Intermediate	Brenlee Mogul-Rotman	

"Research... is used to establish or confirm facts, reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories." Seating/Mobility intervention is a complex process from assessment to set up. The team works with the client to provide appropriate devices that fit the client, work within all environments and allow function and daily activities. How do research findings help us to practice better and to provide recommendations to our clients? Our daily practice requires that we are up to date on what is current and 'new'. Historically, pressure injury etiology has revolved around ischemic changes in the skin, and soft tissue. It is now understood that there is a difference in development of a superficial pressure injury versus a suspected deep tissue pressure injury. This presentation will review a variety of research studies relevant to pressure management and tissue integrity. Positioning options, pressure management maneuvers, effects of surfaces on the skin and deep tissues all impact our clients and our daily practice. The research and evidence will be reviewed along with the transfer of findings to everyday clinical practice recommendations. Research is necessary to further our understanding of what we do on a daily basis to assist our clients. Taking the findings and utilizing them to better assist our clients with practical strategies and adaptive device selection is imperative.

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IC69	Sip'n Puff: A Thing of the Past?	Intermediate	David Kreutz	

This presentation will take a whimsical look at pneumatic switch systems for power seating and mobility. Are pneumatic controls a thing of the past and soon to be extinct? A pneumatic switch (sip and puff for you clinical folks) is one option that can serve as a very functional means of operating a power wheelchair. As clinicians and ATPs, are we maximizing the clients function and safety by fine tuning the programming adjustments to ensure that our clients can utilize the full potential of their power wheelchair when controlled with a pneumatic switch system. Attendees will be introduced to the basic operation of power wheelchairs and power seating through pneumatic controls. Attendees will be encouraged to discuss the advantages and disadvantages of pneumatic drive system, programming functions and alternative drive control systems for various power wheelchairs. We will compare and contrast alternative control devices currently available for individuals who are unable to use a standard joystick control system. Case studies will be used to demonstrate the development of wheelchair skills using pneumatic controls.

IC70	Challenges and Solutions in Seating for Infants and Toddlers	Beginner	Janice Herman	

This course will explore seating and positioning in an overlooked and underserved population – multiply disabled children during Early Intervention (birth to 3). First we need to resolve the controversy of whether or not it is even appropriate to use devices to sit a non-sitting child. So we will examine research-based benefits of developmentally appropriate sitting and the risks of not intervening. Then case studies will illustrate application issues unique to this population and how we can better position them with or without a mobility base. Setting goals must incorporate caregivers and therapists or the equipment won't be used. The mat exam needs to address anatomical, neurological, reflex, and motor control differences because infants are really not miniature adults. Techniques must be modified for measurements, simulation, and intervention. Appropriate commercial equipment is sparse and poorly funded, so we will also demonstrate solutions using low cost do-it-yourself equipment, as well as, advanced technology in computerized carving (CNC router/mill).

IC71	Creating Partnerships Among Clinicians and Engineering Programs	Beginner	Lisa Kenyon	

Have you ever wanted a custom-built piece of equipment for a specific patient? This session outlines ways in which clinicians can partner with engineering education programs at their local colleges or universities to create customized adaptive equipment designed to meet the needs of individual patients. Working with clinicians provides engineering students an interprofessional opportunity to work on meaningful product design experiences while clinicians and patients can benefit from access to customized adaptive equipment. Case examples from our partnership between an undergraduate engineering program and area physical and occupational therapists will be presented and discussed. Opportunities and advantages pertaining to involving physical and occupational therapy students in the partnership will also be proposed. Potential sources of funding to help cover the cost of materials used to create the customized adaptive equipment will be posited. Keys to success within our partnership will be highlighted from the perspectives of clinicians, patients and families, and engineering faculty. Unanticipated positive outcomes related to changes in the engineering students' perceptions of people with disabilities will also be discussed. Considerations and expectations for realistic outcomes for patient-centered projects undertaken within such partnerships will be explored.

IC72	**Back to the "Ideal" Ultralight Manual Wheelchair**	**Intermediate**	**Rosemarie Cooper**	

Despite very challenging, very frustrating and at times disheartening changes related to provision of seating and mobility devices in the US we believe that we can still have a realistic chance to provide appropriate equipment for our end users; however, funding , although very important, will not be the focus of this session. We seek to find our way back to the " ideal" in ultralight manual wheelchair provision and set up, as it was done in the 90's, when acute rehab stays for patients with SCI were at least 6 months and therapy programs extended beyond basic ADLs , and included training of advanced mobility skills for independent function outside the home as well as recreational mobility skills to enhance quality of life for the individual; unheard off in today's acute rehabilitation environment, given the short 4-6 weeks average rehab stays and Medicare's "in-the-home-only" funding policy. In this session we would like to share with the audience the approach we have taken on the way back to the "ideal" and the areas that guided its path. We plan to talk about the current state of acute SCI Inpatient Rehabilitation (Lee Tempest), present the role of SCI peer support groups (Bryan McCormick) ,share findings applied from wheelchair sports (Rory A. Cooper) and focus on the final fitting and training of ultralite manual wheelchairs (Rosemarie Cooper) .

PS9	**Paper Session 9**			
PS9.1	**Using Wearable Sensors to Track Upper Extremity Motion in Rehabilitation: A Literature Review**	**Beginner**	**Akhila Veerubhotla**	

Wearable sensors have become increasingly popular in tracking upper extremity motion for different rehabilitation applications due to their low-cost and portable nature. This review paper summarizes these applications where wearable inertia motion sensors are used to assess the level of upper extremity use post spinal cord injury or stroke, to correlated with observation-based clinical outcome measures for potential use as outcome tools, to support therapeutic interventions on upper extremity rehabilitation, and to assess upper extremity kinematics during activities of daily living such as wheelchair propulsion. The paper also gathers information regarding the validity of such sensors in tracking upper extremity motion and discusses the influence of their accuracy on different rehabilitation applications. Barriers and facilitators to clinical deployment of wearable sensors in upper extremity analysis are discussed.

PS9.2	**Common Sense about Usable, Accessible, and Inclusive Seating**	**Beginner**	**Naomi Petersen**	

A new Accessibility Studies Program is focused on proactively designing civic space and communication to prevent barriers to participation. Curriculum for the core courses for the undergraduate degree and professional development certificate will be outlined. Background information includes the current legal context requiring compliance with connections to careers that require competence in identifying common barriers to access and their solutions. Presented here are the competencies specific to public seating arrangements, ranging from classrooms and office reception areas to parks and recreation events. The focus is on the common sense we wish everyone had, not just professionals in health sciences fields specializing in disability accommodation.

PS9.3	**Wheelchair Rugby Project: Academic and Clinical Collaboration**	**Beginner**	**Maria Eismann**	

This session presents a case example of collaboration between a graduate student and clinician scientists to design, conduct, and implement research examining shoulder overuse injuries among wheelchair rugby athletes. Two primary aspects are addressed: the role of a clinical scientist in a research setting, and the results and value of clinical research. This topic is important to a wide variety of professionals as it demonstrates a clear example of clinical, academic, and research teamwork. The clinician scientist plays a valuable role in providing knowledge, skills, and clinical reasoning to the research project. This expertise plays complementary to the research skills provided by the graduate student and advisor team members. With emphasis on both clinical and research avenues, the collaborative effort allows current clinical practice to translate into evidence-based research through data collection and analysis. The research project aims to assess the prevalence, intensity, and specific category of shoulder pain. The team conducted a prospective, longitudinal cohort study to collect data using applicable clinical measures and analyze results with relevant clinical implications. Results provide descriptive information about the wheelchair rugby team and confirm the presence of shoulder pain as an impactful factor. Future research will target interventions for shoulder pain management and injury prevention and continue to foster collaboration between disciplines.

PS9.4	**Self-Care Health Platform for Individuals with Spina Bifida**	**Beginner**	**Andi Saptono**	

Secondary complications in individuals with Spinal Cord Injury (SCI) can be prevented through adherence to self-care routines. Mobile health platform (mHealth) has been viewed as the technology that can feasibly facilitate self-care routines, such as managing medication, due to their 'always close, always present' nature. Previous study of mHealth for individuals with Spina Bifida has reported reduction of hospitalizations and emergency room visits. To empower individuals with SCI in taking more ownership of their self-care, the mHealth platform is extended to provide education and the opportunity for caregivers to participate in the self-care activities. The educational module includes both traditional education customized to individual's condition, and gamification. Gamification is featured in the setting of goals related to self-care tasks. Individuals with SCI can rate themselves based on their performance in achieving these goals. The mHealth also introduces new caregiver app, which allows individuals with SCI to share their information with their caregivers. The privacy setting also gives individuals the opportunity to adjust their caregiver's involvement in their self-care activities, such as allowing caregiver to remind them about missed schedules or assist in reordering medications. Overall, these extensions serve as both knowledge resource as well as method to keep individuals with SCI and their caregivers engaged with the mHealth.

Saturday March 4, 2017 - 9:30am to 10:45am

IC73	**Custom Molding; Who, Why and How Tips from the Collaborative Team**	**Intermediate**	**Lindsey Veety**	

Nothing is more frustrating than looking at a client and their seating system and seeing that they don't match. Not having a good match can lead to an increased risk of skin breakdown or a decrease in functional ability due to the lack of postural support. This session will focus on the process our team takes to achieve optimal results when a complex patient requires custom seating. This session will take the participants from start to finish when a client enters the seating clinic including vital tips to improve how the custom molding process is done. The session will focus on the importance of beginning the process with a thorough clinical evaluation, tips and techniques to optimize positions and outcomes during the molding session, tips for digitizing or scanning molds, selecting foam and material types, using tilt functions to your advantage, and the benefits of mid-fittings prior to delivery when appropriate. Different types of molding manufacturers and systems will also be covered. Outcomes and goal setting at time of evaluation will also be discussed to ensure client/clinical/vendor team is all on the same page at time of delivery for optimal outcome. This session is being presented by a combined clinical and vendor team, to show that when the team collaborates and thinks outside the box, the client will achieve the optimal outcome.

IC74	**Providing Assistive Technology for the MS Client**	**Beginner**	**Carina Siracusa**	

Clients with multiple sclerosis have varying mobility needs based on their current status and the progression of their disease. When discussing assistive technology for these clients it helps to have an interdisciplinary team consisting of multiple therapists, physicians and social workers to determine the best assistive device for these clients. This presentation will discuss the progression of multiple sclerosis as well as the physical challenges facing patients and affecting their mobility status. The presenters will discuss the newest treatments for MS and how they affect overall musculoskeletal functioning. Finally the presenters will discuss the members of the interdisciplinary team for the OhioHealth clinic and how they go about evaluating the client for a mobility device as well as how to help that device get funded.

IC75	**The Clinician Scientist: A Foundation for Leadership**	**Intermediate**	**Carmen Digiovine**	

The role of the rehabilitation professional is constantly evolving and advancing. Given the development of clinical doctorate programs, residency programs and engineering internships, rehabilitation professionals (e.g. occupational therapists, physical therapists and rehabilitation engineers) are better trained to evaluate and apply innovative research, technologies and program models into clinical practice. As part of these programs, OTs, PTs and REs have exposure to research, innovation and program development prior to graduation. Programs are focused on skills that develop clinicians, leaders, innovators, researchers and educators. We have leveraged these skills for the purpose of education, innovation, research, and clinical practice, in terms of mentoring recent graduates and as well as seasoned rehabilitation professionals. The clinician scientist represents the application of education (professional development, precepting, internships), research and development (collaboration with researchers), and clinical practice (evidence based practice and program development). Many rehabilitation professionals shy away from the clinician scientist role because they assume it means giving away time and resources. However, this can create an opportunity for individual professional development, for increased visibility of the sitting and mobility program, for developing other revenue lines, and most importantly, improved clinical outcomes for individuals with disabilities.

IC76	**Training and Education for Novice Wheelchair Users**	**Beginner**	**Hsin-Yi Liu**	

Knowledge about wheelchair use and the process of getting a wheelchair is essential to empower novice wheelchair users to self-advocate for their needs and facilitate independent living and health. In this 75 minute-course, we will go over key information about wheelchair service delivery, wheelchair fit, skills, maintenance, and health that a novice wheelchair user should know to prepare themselves to make the best use of their wheelchairs. At the end, we will introduce a series of online resources that clinicians can direct wheelchair users to find free high-quality, evidence-based materials about wheelchairs and the service delivery process . We will also introduce the smartphone app Virtual Wheelchair Coach developed at the University of Pittsburgh and explain how wheelchair users can use this app to prepare for the process of getting a wheelchair and review information about wheelchair use.

IC77	**Keep Calm and Evac On!**	**Beginner**	**Kathryn Fisher**	

Emergency evacuation of disabled individuals is a difficult undertaking without the proper planning and forethought. Many disciplines are involved including emergency preparedness, occupational health and safety, occupational therapy and perhaps safety and security. Schools in particular present even a greater challenge when it comes to the duties and responsibilities of getting children with physical disabilities safely out of the classroom. This presentation will review the planning process and training involved with the safe transfer out of a building during a crisis including stairway descended. Cases studies will highlight transfer techniques and positioning of children and young adults with physical disabilities onto equipment for evacuation (evacuation chairs).

IC78	**Car Seats and Vehicular Transport for Children with Special Needs**	**Intermediate**	**Amber Yampolsky**	

When seating and positioning is mentioned equipment specialists commonly go straight to a wheelchair or other seating for mobility or home use. A frequently overlooked area and one that can be a matter of life and death is seating and positioning within the family vehicle. Many children with special needs have custom wheelchairs to provide adequate postural support but are then placed either in a standard car restraint or a less than ideal commercial child restraint. What many families are unaware of are the variety of special needs seats that are available to provide their child with the needed and necessary postural support and protection to ensure safety during transportation in the family vehicle. Special needs car seats can range from infant style seats for rear facing transport to harnessed boosters and seats with wheelchair components for positioning. The knowledge gap can be decreased by ensuring that clinicians who are recommending and providing equipment think outside the “chair” and take seating and positioning on the road. There are a variety of special needs car seats on the market to meet many different needs including: recline for head and trunk control, supports for postural protection, alternative securement for escape artists, and extended harness use. This course will provide education on what child restraints are available, what benefits they can offer, and how to go about selecting and acquiring a special needs car seat.

IC79	**Assistive Technology Collaboration Between Occupational Therapists and Speech Language Pathologists in Adult Rehab Setting**	**Intermediate**	**Amy Grace**	

Assistive Technology (AT) Rehab provides many opportunities for a multidisciplinary approach, including collaboration between Occupational Therapists (OT) and Speech Language Pathologists (SLP). Within the outpatient adult rehab setting (neurologic populations), our clients range in age, background, and levels of physical disability, which lends itself to a multidisciplinary approach for providing specialized services in determining need for Augmentative and Alternative Communication (AAC), as well as custom w/c seating equipment. We have found that a collaborative approach in providing AT services, allows us to better serve the goals of our clients, families, caregivers, and community partners. With specialized equipment evaluation, service delivery, training and follow up interventions, we are finding improved success in client implementation of their devices within the home and community settings. This course will focus on AT models of service delivery, process of OT, SLP specialized evaluations for AAC, custom w/c equipment, selection equipment including: examples of feature matching, high versus low tech options, equipment mounting solutions, switch options. Emphasis will be provided in areas of successful implementation, as well as solutions for AT follow up. Case studies will be presented to assist in the clinical application of OT, SLP collaboration for AAC, custom wheelchair evaluation, service delivery and implementation for the neurologic populations that we serve on a daily basis.

IC80	**Expanding Roles of Therapist Assistants and Wheelchair Provision**	**Intermediate**	**Sheilagh Sherman**	

Have you heard the saying "The right person, in the right job, with the right skills, at the right time"? Have you ever thought it applies to wheelchair provision and therapist assistants? Due to tight healthcare budgets, the role of the therapist assistant, and the clinical settings in which the assistant works, are expanding. While not replacing prescribing therapists, assistants provide support in all the steps of wheelchair provision – from referral through to discharge. This session describes the various tasks assigned to therapist assistants related to wheelchair provision and how clinical setting influences the tasks assigned. Based on an informal survey of therapists working in seating and mobility in clinical settings ranging from acute care to inpatient rehabilitation to community care to long-term care/complex continuing care to seating clinics, this session also describes the themes that emerged related to supervision of support personnel in seating and mobility. The themes, which included communication, collaboration, knowledge base and skills development, are well represented in the literature regarding therapist assistants, which also will be highlighted. Participants will be encouraged to share their experiences regarding service delivery models and the role of the therapist assistant within the models to allow for sharing of ideas and learning amongst the group.

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PS10	**Paper Session 10**			
PS10.1	**Changes in EEG Spectra in Response to Power Mobility Training**	**Intermediate**	**Lisa Kenyon**	

Recent research suggests that power mobility training may provide beneficial learning opportunities for children with multiple, severe disabilities even though these children may never become independent, community drivers. This case series explored the impact of power mobility training on 3 children ages 4-6 years who had multiple, severe disabilities. A multiple-baseline, single-subject A-B-A-B design was conducted over a 20-week period (5-week duration of each phase). The Dimensions of Mastery Questionnaire (DMQ) was administered each week and weekly electroencephalography (EEG) data was recorded under various conditions. Additional outcome measures included the Canadian Occupational Performance Measure (COPM), the Assessment of Learning Power mobility use (ALP), the Wheelchair Skills Checklist (WSC), and a qualitative maternal interview. During intervention phases, children participated in individualized power mobility training activities. At the completion of the final intervention phase, all participants demonstrated significant improvements on the COPM, ALP, and WSC. Themes within the maternal interview revealed mothers' positive perceptions related to power mobility training for their child. Despite these positive changes in function, changes in the EEG spectra were variable and open to interpretation. Together results indicated a diverse set of favorable learning outcomes, warranting further research into the impact of power mobility training in this population.

PS10.2	**Is Empowering Indoor/Outdoor Mobility Medically Necessary?**	**Advanced**	**Jill Barnett**	

This paper presents a case study about how provision of an indoor/outdoor powered wheelchair has minimised the risk of depression in a patient with ALS by empowering independent access to outdoor living environments and recreational amenities, thereby significantly improving his quality of life. It argues that occupational deprivation associated with inability to travel independently outside of the home is a significant health risk existing inside the home, and should therefore be recognised as a valid rationale for the medical necessity of indoor/outdoor powered wheelchairs. It combines recorded interviews with the patient and introduces his OT to explain the therapeutic impact of empowering access to outdoor amenities with references to studies that indirectly imply the link between home 'entrapment' and medical risk. It notes the absence of directly relevant clinical research and calls for a study to assess the health risks associated with home 'entrapment', and the potential to minimise costs of medical care and extend life expectancy of patients with severely restricted mobility whose health may be improved by empowering their ability to travel independently outside of their home. It suggests the potential for the online platform Views from the Chair to be used as a means to identify relevant case studies and help gather testimonial and other forms of evidence.

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PS10.3	**Parents' Perspectives of Infants using Modified Toy Cars**	**Intermediate**	**Emma Regan**	

Power wheelchairs offer children with mobility impairment the chance to move, play and interact with their environment. Early use of power mobility has shown to increase learning and socialization however remains an underutilized intervention with infants. Size, cost, appearance and attitudes toward wheelchair acceptance contribute to them being rejected by the parents. This study aim was to investigate parental views on using a modified electronic toy car on social interactions of infants with mobility impairment over an 8-week period. A mixed method design was used with 5 parents of 5 immobile children with Spina Bifida aged between 13 and 37 months. Participants were recruited via a charity who support people with Spina Bifida. Parents were asked to use the car with their child over an 8-week period and to keep a weekly log of their feelings during this time. Parents completed a questionnaire (Psychosocial Impact of Assistive Devices Scale) pre and post intervention to evaluate the likelihood of retention or abandonment of the car. Semi-structured interviews were completed with parents following the 8 weeks. Interview transcripts, data from the PIADS and the parental logs were analyzed and examined for correlations. Key themes revealing the parents' perception of using the toy car with their child will be presented. Outcomes of this study will identify the impact of using a modified electronic toy car with infants with mobility impairments as reported by their parents.

PS10.4	**Preliminary Design of Assistive Robotic Arm for Kitchen Tasks**	**Beginner**	**Molly Jeffers**	

Many kitchen tasks require reaching, lifting, and grasping, all of which can be a challenge for people with disabilities. The KitchenBot aims to increase independence through assistance with activities of daily living within the kitchen, such as cooking and cleaning. The robotic arm that is currently mounted on the KitchenBot (Kinova JACO arm), does not have the ability to withstand a payload greater than 3 lbs. Development of a robotic arm that can perform kitchen tasks, especially those that require lifting heavy objects, will further increase the independence of KitchenBot users. The result of a preliminary design of an assistive robotic arm yielded a model that has a minimum payload of 10 lbs., yet still has the flexibility required for kitchen tasks.

Saturday March 4, 2017 - 11:00am to 12:30pm

SS5	**Closing Session**	**Beginner**	**Soren Kaplan**	

Our Closing Session will feature Keynote Speaker, Soren Kaplan, PhD. "Leapfrogging."