

## **ABSTRACTS:**

**Wednesday 6<sup>th</sup> April 2022**

### **PLENARY: Understanding purpose in the collision of profession and parenthood.**

**Dr Tim Adlam**

How I understood the purpose of technology in the collision of profession and parenthood when my twin sons Jonathan and David were born. David lived only 20 minutes with anencephaly, and Jonathan who has CP, autism and CVI, is now sixteen and thinking about his future. As I tell my story of being a father to Jonathan and my work with disabled children and people with dementia, I will explore what technology is for, how we create technology that works, and some thoughts about the global future of technology for disabled people.

#### **Presenter Biography**

Dr Tim Adlam is an Associate Professor of Global Disability Innovation at UCL Global Disability Innovation Hub in London, and director of the multidisciplinary MSc in Disability, Design and Innovation. For over 20 years, Tim has worked to create technology to enable disabled people to do what they want to do, working across physical and cognitive disability, including early powered mobility and dynamic seating for children with dystonia. He advocates a thoroughly engaged approach that solves problems that matter to disabled people with beautiful, useful and usable technology. Children are born curious so it is important that we enable all children to do what they love to do: to explore and discover the unknown in the world and in themselves. To do this, they need to move. Tim is father of a child with autism and cerebral palsy who has taught him never to make assumptions about what is possible.

## **A8: “Bridging the Gap” - Implementing a community therapist led wheelchair assessment clinic within inpatient rehabilitation wards.**

Angela Kennedy  
Canterbury DHB, Christchurch, New Zealand  
Physiotherapist

### **Learning objectives**

1. To understand current challenges of working within DHB system to provide timely and accurate equipment provision.
2. To look at a different way to deliver service and improve the patient journey from inpatient to outpatient services
3. To look at innovative ways to educate emerging therapists and maintain accreditation for those existing therapists
4. Review of waiting times, therapist satisfaction and outcomes for clients

### **Abstract**

Burwood hospital is a large rehabilitation hospital based in Christchurch, NZ. It consists of wards dedicated to stroke, older persons health, brain injury, orthopaedic and spinal injury rehabilitation. In Christchurch most of our MOH level 2 wheelchair and seating assessors are based in the community setting which is not currently directly attached to the hospital. Increasing concerns around long delays in referral, lost applications, prescription errors, communication breakdowns and difficulties with clinical support for inpatient staff led to a pilot of an inpatient assessment clinic for clients over 65

that was led by our community level assessors.

This presentation outlines how we went about reviewing, planning and implementing the inpatient wheelchair clinic and our results over the last 2 years.

### **Content references:**

- 1) World Health Organization, 2015, *WHO Wheelchair Service Training Package for managers and stakeholders*, World Health Organization, Geneva, viewed 15 June 2017, from <http://www.who.int/disabilities/technology/wheelchairpackage/wstp/managers/en/>
- 2) GoldbergM, PearlmanJ, RushtonP, et al. The International Society of Wheelchair Professionals (ISWP): a resource aiming to improve wheelchair services worldwide. *Br J Occup Ther.* 2018;81:671–672.
- 3) ISO 16840-1:206 - Wheelchair seating — Part 1: Vocabulary, reference axis convention and measures for body segments, posture and postural support surfaces

### **Presenter biography**

I am a Community based physiotherapist who has worked within the CDHB for 25 years (excluding the obligatory few years in UK). I have a special interest in wheelchair and seating provision, education and service development and worked within a specialist wheelchair and seating service for a number of years before moving to generalised community work. Due to increasing demands on the sector we are always looking for ways to improve service delivery for our clients and best utilise the staffing resource we have available. At home I have a grumpy husband, 2 grumpier teenage children, 2 loving dogs and an indifferent cat

## A9: Breaking New Ground: Establishing an advanced practitioner (Wheelchair & Seating) role in Hawkes Bay.

Antjedine Borchers

Advanced Practitioner wheelchair & seating / Occupational Therapist  
Hawkes Bay DHB, Hastings, New Zealand

### Learning objectives

1. describe role of Advanced Practitioner in wheelchair and seating at HBDHB
2. compare wheeled mobility service delivery at HBDHB to their own
3. identify need of support for therapists gaining and keeping Level 2 WMPM  
Enable accreditation

### Abstract

Hawke's Bay DHB went through a period where they lost experienced therapists, leading to increased expectations for less experienced therapists, poorer outcomes and longer waitlists for clients, increased stress and decreased job satisfaction for therapists and a struggling service overall. About two years ago there was only one therapist with Wheeled Mobility and Postural Management Level 2 accreditation left at the DHB.

A new, innovative approach was needed, and an Advanced Practitioner role for wheelchair and seating was created. Establishing a new role comes with challenges. The lofty goals set for this role included:

- Providing safe and clinically effective comprehensive assessment and intervention, with demonstration of advanced knowledge and skills to manage complex presentations to patients and their whānau.
- Provide clinical leadership in wheelchairs and seating for therapists

in multiple services, including rural areas, acute inpatient teams, adult community teams and child development services.

- To ensure and prioritise a focus on safe and high-quality patient care while weaving together teaching and learning for clinicians.

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There have been huge achievements in the first year of the role that have proven the value of an Advanced Practitioner role in wheelchairs and seating.

- Reduction in waitlist for patients requiring assessment at all levels
- Monthly Special Interest Groups which have included in-services, presentation of case studies, manual wheelchair skills training and equipment review
- Progress towards regular wheelchair and seating reviews for adults
- A workforce who feel supported and now has an increased interest in gaining accreditation

Conclusion: The establishment of a groundbreaking Advanced Practitioner Role (wheelchair and seating) in Hawke's Bay has turned around the service. The outcomes for patients and clinicians have been significant, and the successes of the role should be shared with other DHBs experiencing the same issues.

### Content references:

- Cohen, L., Greer, N., Berlinger, E., & Sprigle, S. (2013). mobilityRERC state of the science conference: Considerations for developing an evidence base for wheeled mobility and seating service delivery. *Disability & Rehabilitation: Assistive Technology* 8(6), 462-471.
- Greer, N., Brasure, M., Wilt, T.J. (2012). *Annals of internal medicine*:

Rockville (MD): Agency for Healthcare  
Research and Quality (US);  
Wheeled Mobility (Wheelchair) Service  
Delivery scope of the evidence  
- Owens, J., Davis, D.D. (2020). Stat Pearls  
Publishing LLC  
Seating And Wheelchair Evaluation

**Presenter biography:**

**Antjedine Borchers**, New Zealand, HBDHB  
Antjedine graduated as an Occupational  
Therapist in 1992 from a German OT School.  
She currently works for the Hawkes Bay DHB.  
She has a strong interest in wheelchair and  
seating provision / 24 hour postural care as  
well as relationship centred practice. She  
worked in Paediatrics for most of her career  
before taking up a position as Advanced  
Practitioner in wheelchair and seating for the  
Hawkes Bay DHB.

## B8: Strengthening the Growth of Sustainable Wheelchair Provision Communities of Practice: The Bigger Picture

Dr. Rosie Gowran<sup>1,2,3</sup>, Dr. Nathan Bray<sup>4</sup>, Dr Paula Rushton<sup>5</sup>, Dr Mary Goldberg<sup>6</sup>, Dr Marie Barhouche Abou Saab<sup>7,3</sup>

<sup>1</sup>University of Limerick, Limerick, Ireland.

<sup>2</sup>Assisting Living and Learning (ALL) institute Maynooth University, Kildare, Ireland.

<sup>3</sup>International Society of Wheelchair Professionals, Pittsburgh, USA. <sup>4</sup>Bangor University, Bangor, United Kingdom.

<sup>5</sup>Université de Montréal, Montréal, Canada.

<sup>6</sup>University of Pittsburgh, Pittsburgh, USA.

<sup>7</sup>SESOBEL, Lebanon, Lebanon

Dr. Rosie Gowran, Course Director, Lecturer MSc Occupational Therapy (Professional Qualification)

Dr. Nathan Bray, Lecturer Healthcare Improvement

Dr Paula Rushton, Associate Professor Occupational Therapy

Dr Mary Goldberg, Associate Professor

Dr Marie Barhouche Abou Saab, Physiotherapist, Head of Technical Aids Unit at SESOBEL

David Constantine, United Kingdom, Motivation International

Ritu Ghosh, India, Mobility India

Jon Pearlman, United States, University of Pittsburgh

### Learning objectives

Upon completion of the session, participants will be able to:

1. Describe the five key positions to address the challenges when accessing appropriate wheelchairs.
2. Reflect on wheelchair provision within their own context, considering challenges and solutions for sustainable development.
3. Identify and prioritize ways to take positive action to strengthen the growth of sustainable wheelchair provision communities of practice

### Abstract

*Introduction:* The World Health Organization's primary role is to direct and lead global health responses with international partners within the United Nations' system. On 28<sup>th</sup> May 2018 the World Health Assembly passed a resolution to improve access to assistive technology for all, in line with the CRPD, Sustainable Development Goals, and the call for action by the WHO Global Co-operation on Assistive Technology (GATE). The provision of wheelchair and seating assistive technology are among the key priority assistive products and WHO have committed to developing global standards for wheelchair provision to meet this primary personal mobility need as a basic human right. However, providing appropriate wheelchairs is complex to meet individual requirements to enhance fundamental freedoms and equal opportunity. Many governments have not committed to national wheelchair provision policy globally. To create a sustainable and seamless wheelchair service delivery system which is woven into the fabric of each community requires careful consideration and planning.

*Approach:* Lead international contributors to discussions, research and actions towards sustainable wheelchair provision development collaborated to explore the global challenges to accessing appropriate wheelchairs from a sustainable human security perspective, supported with scientific and grey literature from 2008 to 2021, and in-country case study examples.

*Findings:* Five key positions emerged, I: *Consideration of key perspectives of wheelchair provision across the life course is essential*, II: *Comprehensive wheelchair service delivery processes and a competent workforce are essential*, III: *Evaluations on wheelchair product quality development, performance and procurement standards are key*, IV: *Understanding the economic landscape when providing wheelchairs is*

*critical. V: Establishing wheelchair provision policy is a key priority globally.*

*Conclusion:* This paper will present each position, its purpose and discuss ways, how together; we as can take positive action to strengthen the growth of sustainable wheelchair provision communities of practice globally.

### Content references:

- 1) Gowran RJ, Bray N, Goldberg M, Rushton P, Barhouche Abou Saab M, Constantine D, Ghosh R, Pearlman J. Understanding the Global Challenges to Accessing Appropriate Wheelchairs: Position Paper. *International Journal of Environmental Research and Public Health*. 2021; 18(7):3338. <https://doi.org/10.3390/ijerph18073338>
- 2) Gowran, R. J.; Clifford, A.; Gallagher, A.; McKee, J.; O'Regan, B.; McKay, E. A., Wheelchair and seating assistive technology provision: a gateway to freedom. *Disabil. Rehabil.* **2020**, 1-12.
- 3) Burrola-Mendez, Y.; Goldberg, M.; Gartz, R.; Pearlman, J., Development of a Hybrid Course on Wheelchair Service Provision for clinicians in international contexts. *PLoS ONE* **2018**, 13 (6), e0199251.
- 4) Toro, M. L.; Bird, E.; Oyster, M.; Worobey, L.; Lain, M.; Bucior, S.; Cooper, R. A.; Pearlman, J., Development of a wheelchair maintenance training programme and questionnaire for clinicians and wheelchair users. *Disabil. Rehabil. Assistive Technol.* **2017**, 12 (8), 843-851.
- 5) Bray N, Kolehmainen N, McAnuff J, Tanner L, Tuersley L, Beyer F, *et al.* Powered mobility interventions for very young children with mobility limitations to aid participation and positive development: the EMPoWER evidence synthesis. *Health Technol Assess* 2020;24(50)

- 6) World Health Organisation. Assistive Product Specifications and How to Use Them. 2021. Available online: <https://apps.who.int/iris/bitstream/handle/10665/339851/9789240020283-eng.pdf> (accessed on 5 March 2021).
- 7) I was unable to add these authors, please add thank you:
- 8) David Constantine, [Constantine@motivation.org.uk](mailto:Constantine@motivation.org.uk), United Kingdom, Motivation International
- 9) Ritu Ghosh [ritugm@mobility-india.org](mailto:ritugm@mobility-india.org), India, Mobility India
- 10) Jon Pearlman, [jpearlman@pitt.edu](mailto:jpearlman@pitt.edu), United States, University of Pittsburgh

### Presenter biography

**Rosie Gowran**, Course Director of MSc Occupational Therapy (Professional Qualification) and Post-Graduate Certificate in Posture Seating and Wheelchair Mobility Across the Life Course, University of Limerick. Occupational Therapist and human rights activist, Rosie's PhD focused on Sustainable Wheelchair Provision. Rosie adopts a human security approach to support people with disabilities, particularly people who use wheelchairs, to address service system challenges and erosion of personhood. Building sustainable communities of practice in health and social care is the overarching theme that drives Rosie's research and education philosophy to advocate for appropriate person-centered service provision as a responsibility of the whole community. She uses participatory, stakeholder-centered inclusive mixed methodologies, towards collective development of sustainable policy, implementation and provision of appropriate wheelchair services to meet peoples' needs across the life course. A member of International Society of Wheelchair Professionals (ISWP), Rosie is a nominated member of the Wheelchair Educator Package (WEP) development team (2020-2022)

## C8: Analysing the cost of failing to include everyone in society with universal design.

[Mr Tim Young](#)

Smart Access Ltd, Hamilton, New Zealand  
Director

### Learning objectives

1. To raise the awareness of the importance of robust data collection of accessibility features in infrastructure, and of the travel patterns of people with disabilities.
2. To explain to participants some of the accessibility features that we collect that they may have not thought about as being important.
3. To encourage participants to ask their organisation or local government to collect such data.
4. At the end of the session participants will be able to identify a range of accessibility features in infrastructure and explain to others why this type of data collection is important.

### Abstract

Currently, there is no used method (or desire) for local and central governments to conduct a cost-effectiveness analysis of implementing universal design (UD) and failing to implement UD in infrastructure and public transport. There is a lack of data collected to provide economists and governments information about where infrastructure accessibility features are present, and a lack of data about where disabled people travel. Without this data no further economic insights can be made.

Smart Access provides comprehensive accessibility audits collecting GPS location data, photos of the accessibility features, and a timestamp.

The information is easy to see in the Smart Access application. It allows users to plan a

safe journey before leaving their house, no matter what their ability levels is.

Unlike past audits that have only collected data on four accessibility features and have not been easily accessible to the general public, we are collecting detailed data on 35 different variables identified through extensive consultation with the disabled community, with all information easy and free for the public to access with the Smart Access application.

Users can choose to see only the accessibility features that affect their travel, so they can effectively plan the best travel route that meets their specific needs. This information allows Council staff to prioritise infrastructure upgrades with extensive data, to improve on your evidence-based approach.

### Content references:

Project Sidewalk out of the University of Washington is the next closest research to use machine learning to automatically detecting accessibility features but is limited to 4 accessibility features and is not very accurate. Saha et al. (2017) developed Project Sidewalk, which uses 'citizen researchers' or crowdsourcing to allow people online to virtually research and assess physical accessibility for manual wheelchair users.

De Jonge and Schraner (2010) have the most advanced method to assess the cost of not providing assistive technology (AT) or universal design to develop an inclusive society. The researchers aimed to measure the effectiveness of assistive technology (AT) and universal design (UD) while also developing a cost-effectiveness analysis that can take into account the many variables within a complex conceptualisation of effectiveness.

To do this, de Jonge and Schraner (2010) decided to use the World Health Organisation's (WHO) framework called the International Classification of Functioning, Disability and Health (ICF). They followed the

classification of activities and participation to identify effectiveness and the classification of environmental factors to identify the relevant costs.

Other than the ICF, models to assess accessibility in infrastructure include the Pedestrian Planning Guide, Universal Design Principles and the Guide to Road Design.

Research on this topic seems to be quite limited which is why I'm completing my PhD in Environmental Planning this year to expand the knowledge in this area.

### **Presenter biography**

**Tim Young** has a background in educational psychology, research, and app development. He is now a research assistant with the Burwood Academy of Independent Living, and a consultant to central and local governments on accessibility issues.

Tim also focuses on using technology to solve accessibility issues after facing many accessibility issues in his own experiences as a tetraplegic. He has a business, Smart Access, which collects and sells data on 33 accessibility variables to local governments to help better prioritise infrastructure spending. Smart Access also provides this data to the public with an app. A town/city-wide accessibility audit gives Councils the information they need to link transport routes to key amenities with universal design, so all of the public can access public facilities.



## C9: Finite element analysis for assessment of tissue-deformation on the buttocks in the context of PI

Carlos Kramer  
Vicair, Wormer, Netherlands  
International Educator

### Learning objectives

1. Upon completion of this session, attendees will be able to understand finite element modeling.
2. Upon completion of this session, attendees will be able to understand how to use finite element modeling to do analysis.
3. Upon completion of this session, attendees will be able to understand that finite element modeling is a valid model to do analysis.

### Abstract

A pressure injury (PU) is defined in the international guidelines as localized damage to the skin and/or underlying tissue as a result of pressure or pressure in combination with shear. Tissue damage that characterizes pressure injuries occurs as a result of intense and/or prolonged exposure to sustained deformations in compression, tension or shear, or a combination of these loading modes.

At the basis of finite element modeling (FEM) lies the development of a representative model of how a real-life object is going to behave when it is met with a specific boundary condition (i.e. pressure applied to the buttocks). MRI tissue deformation data serve as boundary constraints to solve the FEM for the imaged tissues.

Techniques available for assessment of internal deformation are magnetic resonance imaging (MRI), elastography, and ultrasound. These imaging techniques can be used in combination with a subject-specific theoretical finite element analysis (FEA) to

estimate deformations, strains and stresses throughout the tissue structures. [EPUAP Guidelines, 2019]

Finite element analysis is often used because of its capability of handling complex geometries and modeling the non-linear behavior of tissues. Finite elements are geometrical shapes of a specific size and are found within a domain. The sum of all elements describe the whole continuum (i.e. soft tissue). By calculating the boundary conditions of these finite elements, you can learn about tissue behavior under stresses.

Finite element analysis has become widely used to model human soft tissue behavior and large tissue deformation. Also in the field of pressure injury research.

After introducing FEM/FEA we will share the first results of a comparison between an air based cushion and a foam cushion.

### Content references:

- 1) Guideline, T. I. (2019). *Prevention and Treatment of Pressure Ulcers / Injuries : Clinical Practice Guideline The International Guideline.*
- 2) Macron, A., Pillet, H., Doridam, J., Rivals, I., Sadeghinia, M. J., Verney, A., Rohan, P., Doridam, J., & Rivals, I. (2019). *Is a simplified Finite Element model of the gluteus region able to capture the mechanical response of the internal soft tissues under compression ? To cite this version : HAL Id : hal-02332239 Is a simplified Finite Element model of the gluteus region abl.*
- 3) Lee, W., Won, B. H., & Cho, S. W. (2017). Finite element modeling for predicting the contact pressure between a foam mattress and the human body in a supine position. *Computer Methods in Biomechanics and Biomedical Engineering, 20(1)*, 104–117.

<https://doi.org/10.1080/10255842.2016.1203421>

- 4) Luboz, V., Petrizelli, M., Bucki, M., Diot, B., Vuillerme, N., & Payan, Y. (2014). Biomechanical modeling to prevent ischial pressure ulcers. *Journal of Biomechanics*, 47(10), 2231–2236.

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## Presenter biography

**Carlos Kramer** specialised himself in seating and positioning through gaining practical experience whilst working for long term care centres, rehabilitation centres and rehab vendors. His educational background is in physics and before pursuing his passion in the industry, he spent 7 years teaching in schools on all levels. He expanded his knowledge of seating and positioning through his close relations and now colleagues Sharon Sutherland-Pratt, Bengt Engström and Bart Van der Heijden. Carlos is the head of education at Vicair since 2012 and continues to combine his expertise in teaching and passion for seating to provide high quality education in the field worldwide.

## D9: Preliminary report on the development of a novel front wheel attachment for manual wheelchairs

[Dr. Jaimie Borisoff](#)<sup>1,2</sup>, Prof. James Laskin<sup>3,4</sup>

<sup>1</sup>British Columbia Institute of Technology, Vancouver, Canada. <sup>2</sup>Elevation Products, Vancouver, Canada. <sup>3</sup>University of Montana, Missoula, USA. <sup>4</sup>Praxis Spinal Cord Institute, Vancouver, Canada

Dr. Jaimie Borisoff, Research Director

Prof. James Laskin, Professor

### Learning objectives

Upon completion of this session, participants will be able to:

1. Identify 3 wheelchair add-on devices that improve wheeling outdoors
2. Describe the novel features and benefits of a new front wheel attachment for manual wheelchairs
3. Compare and contrast end-user and therapist feedback about the novel device and general issues experienced by users when wheeling outdoors

### Abstract

The small front caster wheels of manual wheelchairs are necessary for the stability and maneuverability needed by wheelchair users, especially indoors or on hard level surfaces. Unfortunately, “casters are [also] parasites” [1] and greatly inhibit wheeling on soft or uneven terrains such as grass, trails, or snow [2-4]. The Freewheel® is the best-known front wheel attachment for manual wheelchairs that help solve this problem by lifting the casters off the ground [2]. These add-ons improve wheelchair propulsion [5] by reducing the rolling resistance via a single large diameter front wheel [3]. Unfortunately, these add-ons all suffer from the same problem: they are cumbersome to attach and difficult to carry/store when not employed, and thus cannot transition quickly and simply from outdoor to indoor wheeling;

consequently, they are left behind at home far too often. To address these problems, a novel front wheel attachment, named SWIVL™, was developed by following a user-centred design process embedded in the Praxis Spinal Cord Institute technology incubator program [6]. Like its competitors, SWIVL™ is attachable to the wheelchair’s footplate; but uniquely, it is stowable - folded up between the user’s legs or underneath their seat, thus preserving nominal wheelchair performance at all times when not required. When desired, SWIVL™ is deployed in seconds by reaching down and “swiveling” it out till it touches the ground. Then with a small “pop” or wheelie it snaps into place and lifts the casters off the ground. When not needed it can be quickly returned to its stowed position. Therefore, individuals can easily shift between using SWIVL™ when outdoors and regular castors when indoors. End-user feedback, collected at several stages of the device’s development, will be presented. We hope that devices such as SWIVL™ can promote greater participation outdoors and contribute to the individual’s autonomy.

### Content references:

- 1) Denison I. The art of wheelchair setup. The 13th International Seating Symposium; Pittsburgh, PA. 2000.
- 2) Denison I and JF Borisoff. Initial Evaluation of the FreeWheel™ Wheelchair Attachment. Rehabilitation Engineering and Assistive Technology Society of North America. Toronto, ON. June 2011.
- 3) Chan FHN, M Eshraghi, MA Alhazmi, BJ Sawatzky. The effect of caster types on global rolling resistance in manual wheelchairs on indoor and outdoor surfaces. *Assistive Technology*. 30(4):176-182. 2018.
- 4) Berthelette M, DD Mann, J Ripat, C M Glazebrook. Assessing manual wheelchair caster design for mobility in winter conditions. *Assistive Technology*. 32: 31-37. 2020.
- 5) Choukou M-A, KL Best, M Potvin-Gilbert, F Routhier, J Lettre, S

Gamache, J Borisoff, DH Gagnon.  
Scoping Review of Propelling Aids for  
Manual Wheelchairs. Assistive  
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- 6) In conversation with Praxis SCI  
Incubate cohort member Elevation  
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[https://praxisinstitute.org/in-  
conversation-with-jaimie-borisoff-  
elevation/](https://praxisinstitute.org/in-conversation-with-jaimie-borisoff-elevation/)

## **Presenter biography**

**Dr. Borisoff** is the Canada Research Chair in Rehabilitation Engineering Design at the British Columbia Institute of Technology, an Adjunct Professor at the University of BC Department of Occupational Science & Occupational Therapy, and a Principal Investigator at ICORD (International Collaboration on Repair Discoveries). His lab performs rehabilitation engineering research and development about various assistive and therapeutic technologies for people with disabilities. Projects include the development of “dynamic” wheeled mobility devices that allow users to quickly change their wheelchair configuration on-the-fly to suit different daily activities, such as the Elevation™ ultralight wheelchair by PDG Mobility, and most recently the SWIVL™ “Stow & Roll Front Wheel™” that instantly switches a manual wheelchair into outdoor mode (with low rolling resistance) whenever you need it and quickly retracts again for full indoor maneuverability.

## **D10: The effectiveness of clinical, therapeutic seating after the Covid-19 pandemic for long term care patients.**

[Martin Cominotto](#)

Seating Matters, Belfast, Ireland

Clinical Director, Occupational Therapist

### **Learning objectives**

Delegates will learn to identify and understand the:

1. Impact that poor sitting posture has upon the long term care patients and their caregivers
2. Contribution of specialized seating in reducing pressure injuries
3. Effects of Covid-19 for the long term care patient as a result of prolonged isolation and 'lockdown' measures.

### **Abstract**

As the immediate effects of Covid-19 became increasingly apparent, we are only now beginning to understand the possible long term effects on patients physical ability, function and wellbeing, as a result of prolonged isolation and 'lockdown' measures. This presentation explores the possible challenges that patients may face as a result of covid-19 and the results of a previous clinical trial examining the effectiveness of individualised seating assessment within long term care facilities and how it can significantly impact the health and wellbeing of patients and caregivers.

This study demonstrates that specialized seating can contribute to a reduction in pressure injuries and postural correction, increased saturated oxygen levels, functional ability and social interaction.

Prescribed seating may contribute to a reduction in pressure injury incidence and increased functional ability. It highlights that each patient is different, requiring

individualized evaluation of seating needs before making recommendations for an appropriate seating system. This research provides evidence based pressure management through therapeutic seating.

The findings from the research are replicated by clinicians worldwide who continue to improve patient care through utilizing therapeutic seating to reduce pressure injuries, encourage early mobilization and reduce caregiver manual handling. Having conducted this ethically approved, clinical research in real life care settings, it makes it manageable for the outcomes to be replicated to improve clinical practice

### **Content references:**

Daly, O., Casey, J., Martin, S., Tierney, M., McVey., O. 2013. The effectiveness of specialist seating provision for nursing home residents. Ulster University: Northern Ireland.

### **Presenter biography**

**Martin Cominotto** is a senior seating specialist and education director at Seating Matters Australia. Martin started his clinical career as a Pharmacist, specialising in complex chronic disease management in the community. Martin is responsible for all clinical training and education for Seating Matters in Australia and New Zealand, as well as complex seating prescription.

## E8: Virtual training: connecting peers to communities through wheelchair skill education.

[Dr Krista Best](#)<sup>1,2</sup>, [Dr. Céline Faure](#)<sup>2</sup>, [Dr. Ed Giesbrecht](#)<sup>3</sup>, [Dr. François Routhier](#)<sup>1,2</sup>, [Dr. William Miller](#)<sup>4</sup>

<sup>1</sup>Université Laval, Quebec City, Canada. <sup>2</sup>Cirris, Quebec City, Canada. <sup>3</sup>University of Manitoba, Winnipeg, Canada. <sup>4</sup>University of British Columbia, Vancouver, Canada

[Dr Krista Best](#), Assistant Professor, Researcher  
[Dr. Céline Faure](#), Research Professional  
[Dr. Ed Giesbrecht](#), Assistant Professor  
[Dr. François Routhier](#), Professor, Researcher  
[Dr. William Miller](#), Professor

### Learning objectives

At the end of the session, attendees will be able to:

1. Describe potential barriers and facilitators to peer-trainer readiness and intervention fidelity with virtual training.
2. Discuss anticipated trends of peer-led approaches to rehabilitation delivery.
3. Apply the content and structure of material presented to other peer-training interventions.

### Abstract

Peer-led wheelchair skills training programs are feasible and promising for improving wheelchair skills, wheelchair use self-efficacy, and satisfaction with participation in meaningful activities.<sup>1-3</sup> Peers are individuals who share the life experience of using a wheelchair for mobility and have received specialized training to support wheelchair skills.<sup>4</sup> Integrating peers in the delivery of wheelchair skills training can enhance the continuum of healthcare delivery from rehabilitation to the community.<sup>1,4</sup>

TEAMWheels is a tablet-based eHealth program combining a wheelchair skills training app and three peer-led training

teleconferences on Microsoft Teams.<sup>5</sup> Pre-COVID, peer-trainers received a two-day in-person preparation course. In light of pandemic-related public health recommendations, this course was reconfigured to be delivered virtually.

Our virtual train-the-trainer program is comprised of videos, videoconferencing, and evaluations of trainer readiness and intervention fidelity. Six asynchronous modules provide instruction about the Microsoft Teams and TEAMWheels applications; the goal setting, monitoring and action planning components of the intervention; and the ‘trainer’s hangout’ built-in Microsoft Teams to keep peers connected throughout the study. A series of 1-hour interactive videoconferences with members of the research team provide review, discussion, and integration of module content. Each session allows the peer trainer to demonstrate their capacity to conduct items from the trainer readiness checklist. Fidelity of the virtual train-the-trainer program is documented during training and will be followed through TEAMWheels application activity.

Five peer-trainers have completed the training program to date. This instructional course will discuss the development of the modules and their current implementation. Considerations for trainer readiness and intervention fidelity will be discussed in reference to the TEAMWheels project, with discussion on how modules may be applied in other areas of rehabilitation. Development of a virtual train-the-trainer wheelchair education program demonstrates **Whanaungatanga**, as it facilitates **connecting people and communities**.

### Content references:

- 1) Best KL, Miller WC, Huston G, Routhier F, Eng JJ. Pilot study of a peer-led wheelchair training program to improve self-efficacy using a manual wheelchair: A randomized

- controlled trial. Arch Phys Med Rehabil. 2016;97(1):37–44.
- 2) Best KL, Miller WC, Huston G, Routhier F, Eng JJ. Pilot Study of a Peer-Led Wheelchair Training Program to Improve Self-Efficacy Using a Manual Wheelchair: A Randomized Controlled Trial. Arch Phys Med Rehabil. 2017;97(1):37–44.
  - 3) Miller WC, Best KL, Eng JJ, Routhier F. Influence of peer-led wheelchair training on wheelchair skills and participation in older adults: Clinical outcomes of a randomized controlled feasibility trial. Arch Phys Med Rehabil. 2019 Jun;100(6):1023-1031.
  - 4) Divanoglou A, Tasiemski T, Augutis M, Trok K. Active Rehabilitation - a community peer-based approach for persons with spinal cord injury: International utilisation of key elements. Spinal Cord. 2017; Jun;55(6):545-552. doi: 10.1038/sc.2017.28

### Presenter biography

**Dr. Krista Best** is an Assistant Professor in the Faculty of Medicine at Université Laval and a Quebec Health Research Foundation Junior 1 Scholar at the Centre for interdisciplinary research in rehabilitation and social integration (Cirris) in Quebec, Canada. Dr. Best has expertise in developing and evaluating community-based wheelchair skills training programs for manual and power wheelchairs, including clinician-led, peer-led and mHealth approaches to training. While most of her research has focused on adults, she has recently begun to investigate best practices in children and youth. A member of the Wheelchair Skills Program editorial committee since 2001, Dr. Best continues to inform the evolution of the Wheelchair Skills Program. She is on the Board of Directors for the Canadian National Society of Prosthetics and Orthotics and Associate Editor for the Assistive Technology Journal.

**Dr. Ed Giesbrecht** began working as an occupational therapist in 1994, developing a particular interest in assistive technology and wheeled mobility, serving as clinical specialist in an Assistive Technology clinic in Winnipeg, Canada. His research interest drew him to academia to pursue a master's and PhD degree. He is an Associate Professor in the department of Occupational Therapy at the University of Manitoba. His research focuses on strategies to address wheelchair mobility skills and training, improving entry-to-practice education, and winter mobility.

**Céline Faure**, PhD, OT, is a research professional at the Centre for Interdisciplinary Research in Rehabilitation and Social Integration in Quebec, Canada. She has a high interest in the development of new technologies to improve rehabilitation and the community reintegration of persons with functional motor limitations. She has expertise in virtual reality and is involved in several research projects to develop training such as eHealth peer-led wheelchair skills training program and exoskeleton gait training combined with functional electrical stimulation.

## A10: Where is the Pelvis? Where is the Head? An advanced look at postural support.

[Jean Minkel](#)

Senior Vice President for Rehab and Mobility Services  
Independence Care System, Brooklyn, NY, USA

### Learning objectives

By attending this workshop participants will be able to:

1. Define at least 3 different positions of the pelvis that a person may assume while sitting up against gravity.
2. Relate the position of the pelvis to the most common resulting spine/trunk position
3. Identify the position of the head, depending on the position of the pelvis and the trunk

### Abstract

The workshop will move from the findings of a mat / supine assessment to using those findings to determine a person's personal posture in the seated position. There will be an emphasis on the effect of gravity when a person sits up and gravity pushes down. We will explore how postural supports can be positioned to provide external support and improve head control. Finally, different pelvic positions will be presented to demonstrate the impact of pelvic positioning on the management of interface pressure while sitting.

### Content references:

- 1) Minkel, J. "Seating and Mobility Evaluations for Persons with Long-Term Disabilities" in Lange, M. and Minkel, J (2018) *Seating and Wheeled Mobility: A clinical Resource Guide*. Slack, Inc.

- 2) Sonenblum, Sharon E, Stephen H Sprigle, and James S Martin. "Everyday Sitting Behavior of Full-Time Wheelchair Users." *Journal of rehabilitation research and development* 53.5 (2016): 585–598. Web.
- 3) Hillman, Susan J, and James Hollington. "A Quantitative Measurement Method for Comparison of Seated Postures." *Medical engineering & physics* 38.5 (2016): 485–489. Web.

### Presenter biography

**Ms. Minkel** is a physical therapist and master clinician well recognized for her work in Assistive Technology. She is currently the Senior Vice President for Rehab and Mobility Services for ICS - Independence Care System, a not for profit, care management agency for persons living with a physical disability in New York City. Jean is also an independent consultant who provides educational and consulting service to all members of the A.T. team.

Jean has been an invited keynote speaker at conferences in the US, Canada, Australia, New Zealand and Japan. She is a published author, including many peer reviewed journal articles and most recently, she co-edited, with Michelle Lange, the newly published textbook, [Seating and Wheeled Mobility – a Clinical Resource Guide](#). The A.T. community has recognized Jean for her contributions by awarding to her, the RESNA Fellow award in 1995 and the Sam McFarland Mentor Award in 2012.



## **B9: From idea to innovation - a practical session on problem solving, design, disability and innovation. (2hr INTERACTIVE SESSION)**

Dr Tim Adlam

Everyone is a designer – we all solve problems and invent solutions. It's what humans do - together. Design is a collaborative activity where no one person has all the answers. This workshop will build on the plenary talk and practically explore how to solve problems and design solutions. We will explore how design thinking can be applied to problems in different contexts and do some designing together in small groups.

### **Learning objectives**

Attendees should be able to:

1. Describe three approaches to design that are relevant to designing for people with disabilities
2. Apply design thinking to solving an everyday problem
3. Evaluate the success of a design

### **Some relevant and interesting references:**

- 1) Orpwood, Roger. (2009). "Design methodology for aids for the disabled". Journal of medical engineering & technology. 14. 2-10. <http://dx.doi.org/10.3109/03091909009028756>
- 2) Pullin, Graham. (2011). "Design Meets Disability", MIT Press, ISBN 9780262516747, <https://mitpress.mit.edu/books/design-meets-disability>
- 3) Holloway, C., 2019. "Disability interaction (DIX) a manifesto". Interactions, 26(2), pp.44-49. <http://dx.doi.org/10.1145/3310322>
- 4) Bound K, Thornton I. (2012). "Our frugal future: lessons from India's

innovation system". NESTA. ISBN 978-1-84875-138-5

[https://media.nesta.org.uk/document/s/our\\_frugal\\_future.pdf](https://media.nesta.org.uk/document/s/our_frugal_future.pdf)

### **Presenter biography**

Dr Tim Adlam is an Associate Professor of Global Disability Innovation at UCL Global Disability Innovation Hub in London, and director of the multidisciplinary MSc in Disability, Design and Innovation. For over 20 years, Tim has worked to create technology to enable disabled people to do what they want to do, working across physical and cognitive disability, including early powered mobility and dynamic seating for children with dystonia. He advocates a thoroughly engaged approach that solves problems that matter to disabled people with beautiful, useful and usable technology. Children are born curious so it is important that we enable all children to do what they love to do: to explore and discover the unknown in the world and in themselves. To do this, they need to move. Tim is father of a child with autism and cerebral palsy who has taught him never to make assumptions about what is possible.

## C10: Kick the Tires! Evaluating Wheeled Mobility Devices for Performance & Safety

Ms. Kendra Betz  
University of Pittsburgh, Denver, USA  
Physical Therapist

### Learning objectives

Upon completion of the session, participants will be able to:

1. Review three critical considerations for evaluating new and emerging wheeled mobility devices
2. Discuss two reasons that objective results from standardized test protocols provide meaningful information about mobility device performance.
3. Describe three common wheeled mobility device failure modes that result in challenges for wheelchair users.

### Abstract

Mobility 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 evaluate existing, new, and emerging mobility technologies to support an accurate and meaningful assessment of potential value and identified limitations. Topics will include regulatory requirements, established international test standards, impact of published literature, ethical considerations, objective and hands-on review of device performance, durability, and safety. 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 to support clients with unique mobility needs.

### Content references:

- 1) Mhatre A, Martin D, McCambridge M, Reese N, Sullivan M, Schoendorfer D, Wunderlich E, Ruchman C, Mahilo D, Pearlman J. Developing product quality standards for wheelchairs used in less-resourced environments. *African J of Disability*. 2017.
- 2) Kirby RL, Miller WC, Routhier F, Demers L, Mihailidis A, Polgar JM, Rushton PW, Titus L, Smith C, McAllister M, Theriault C, Thompson K, Sawatzky B. Effectiveness of a Wheelchairs Skills Training Program for Powered Wheelchair Users: A randomized controlled trial. *Arch Phys Med Rehabil*. 2015; 96 (11): 2017-26.

3) Hogaboom NS, Worobey LA, Houlihan B, Heinemann A, Boninger M. Wheelchair breakdowns are associated with pain, pressure injuries, rehospitalization, and self-perceived health in full-time wheelchair users with spinal cord injury. *Arch of Phys Med Rehabil.* 2018 Oct;99(10): 1949-1956.

4) Betz K, Dicianno B, Pearlman J, Karg T, Mandala M, Jacobs K, Bagian T. Clinical Limits of Use Tools (CLOUT) for Wheeled Mobility Devices. February 2018.

[www.ncps.va.gov/professionals/publications/CLOUT.asp](http://www.ncps.va.gov/professionals/publications/CLOUT.asp)

### **Presenter biography**

**Kendra Betz** is a Physical Therapist and RESNA Assistive Technology Professional who is speaking at OSS as adjunct faculty for the University of Pittsburgh. She has also worked for the Veterans Health Administration in the USA since 1993. Kendra's areas of clinical specialization include SCI rehabilitation, assistive technology, adaptive sports, and patient safety. Kendra teaches regularly at national and international forums, leads national projects for medical device evaluation and has developed innovative programs to provide specialized support for adaptive athletes. Her expertise is recognized in the USA by induction into the National SCI Association Hall of Fame, the Air Force Association's Employee of the Year Award, and the Clinical Excellence and Distinguished Lecture Awards from the Academy of SCI Professionals.

## D11: The pediatric powered wheelchair standing device: a historical perspective

Dr. Lisa K. Kenyon<sup>1</sup>, Dr. Bonita Sawatzky<sup>2</sup>  
<sup>1</sup>Grand Valley State University, Grand Rapids, USA. <sup>2</sup>University of British Columbia, Vancouver, Canada  
Dr. Lisa K. Kenyon, Professor

### Learning objectives

At the completion of the session, attendees will be able to:

1. Explain 3 ways in which powered wheelchair standing devices have evolved over the past 40 years.
2. List 3 potential factors that have affected of powered wheelchair standing device development for children
3. Discuss 3 societal changes that have enhanced our ability to provide powered wheelchair standing devices to children
4. Compare and contrast various pediatric PWSDs from around the world

### Abstract

Idioms such as ‘stand up for yourself’, ‘as sure as I am standing here’, and ‘stand your ground’ reinforce standing as a societal norm symbolizing independence, dignity, and autonomy. For children who use a powered wheelchair, a powered wheelchair standing device (PWSD) may offer more than just opportunities for lower extremity weight bearing. This session will explore pediatric PWSDs through the lens of a historical perspective. We’ll start in the 1970s with the development of the first standing wheelchair devices/PWSDs for adults and examine the evidence-based value and benefits of these early devices. We will then shift our focus to the evolution of pediatric PWSDs and track changes in pediatric PWSDs to society's changing values and beliefs over time

regarding adults and children with disabilities. We’ll then explore potential factors influencing pediatric PWSD design and use. Finally, we will compare and contrast various pediatric PWSDs from around the world.

### Content references:

- 1) Townsend EL, Bibeau C, Holmes TM. Supported standing in boys with Duchenne muscular dystrophy. *Pediatr Phys Ther.* 2016;28(3):320-329.
- 2) Tally MK, Pope EM. We're still standing. *Rehab Manag.* 2020;33:6-9.
- 3) Vorster N, Evans K, Murphy N, KavaM, et al. Powered standing wheelchairs promote independence, health and community involvement in adolescents with Duchenne muscular dystrophy. *Neuromuscul Disord.* 2019; 29(3):221-230.
- 4) Bayley K, Parkinson S, Jacoby P, et al. Benefits of powered standing wheelchair devices for adolescents with Duchenne muscular dystrophy in the first year of use. *J Paediatr Child Health.* 2020;56(9):1419-1425.
- 5) Schofield C, Evans K, Young H, et al. The development of a consensus statement for the prescription of powered wheelchair standing devices in Duchenne muscular dystrophy. *Disabil Rehabil.* In press. Available in advanced on-line as of 02 September 2020 at:<https://doi.org/10.1080/09638288.2020.1810786>.
- 6) Kenyon LK, Harrison KL, Huettner MK, Johnson SB, Miller WC. “Stand-on-demand’: a qualitative study exploring stakeholder perspectives of pediatric powered wheelchair standing devices. *Dev Med Child Neurol.* In press. Available in advance on-line as of 19 February 2021 at: <https://onlinelibrary-wiley-com.ezproxy.gvsu.edu/doi/epdf/10.1111/dmcn.14842>.

## **Presenter biography**

**Lisa Kenyon** is a Professor in the Department of Physical Therapy at Grand Valley State University in Grand Rapids, Michigan. Dr. Kenyon heads the Grand Valley Power Mobility Project, an inter-professional research and service project that provides power mobility training for infants, toddlers, children and young adults who are not typically considered to be candidates for power mobility use. Dr. Kenyon presents nationally and internationally on topics related to pediatric physical therapist practice and has published multiple peer-reviewed journal articles and book chapters pertaining to power mobility and pediatric topics. Dr. Kenyon currently serves on the Editorial Committee for the Wheelchair Skills Program (Dalhousie University, Halifax, Nova Scotia, Canada) and on the Pediatric Specialty Council of the American Board of Physical Therapy Specialties.

**Bonita Sawatzky** is an Associate Professor in the Department of Orthopaedics at the University of British Columbia. Dr. Sawatzky has worked extensively with people with spinal cord injury, including traumatic and non-traumatic populations, as well as adults and children. The focus of her research has been to find ways to make mobility easier and more efficient for those with spinal cord injuries with over 80 peer reviewed publications. She aims to develop a better understanding of the biomechanics of mobility and identifying ways to educate individuals on how to walk or wheel more effectively. In addition, Dr. Sawatzky has begun to explore more specifically issues related with ageing such as technologies and training for older populations, as well as understand functional changes with ageing of individuals with rare neuro/orthopaedic conditions. She worked with the Vancouver ISS committee for 18 years and now enjoying working with the OSS organizing committee!

## E9: A Pilot Study Comparing Postural and Functional Skills in Supportive vs. Unsupportive Wheelchair Backs

[Dr. Jessica Pedersen](#)<sup>1,2</sup>, [Dr. Cynthia Smith](#)<sup>3</sup>

<sup>1</sup>Shirley Ryan AbilityLab, Chicago, USA.

<sup>2</sup>Devices 4 the Disabled, Chicago, USA.

<sup>3</sup>Private Practice, Denver, USA

Dr. Jessica Pedersen, Clinical Director/Research Assistant

Dr. Cynthia Smith, owner

### Learning objectives

1. Identify two outcome measures for determining the benefits of a back support
2. Describe a method for measuring a kyphosis when sitting in a wheelchair
3. Identify evidence demonstrating differences in forward upward reach when using two different backs

### Abstract

Does a back support make a difference for people with a C6-T4 SCI? The intervention of back supports for people with spinal cord injury began in the 1980s. Since that time, many products were introduced to provide posterior support at the pelvic and sacral area in an effort to neutralize pelvic tilt and promote a more upright spine. Does a back support, placed in an optimal position to prevent a posterior pelvic tilt, make a significant difference compared to no back support? What outcomes make a statistical significance? This study looked at the ability to maintain spinal alignment, spirometry outcomes, reach, pain, and wheelchair skills with a person using a K5 wheelchair with and without a back support. This presentation will demonstrate how a clinician can practically gather evidence in the clinic to demonstrate any physical or functional changes with a back support intervention. This data can help in clinical decision making as well as provide data to support reimbursement to third party payers questioning the expense. Participants

will learn the process for incorporating research into a clinical setting including determining the research question, developing a PICO, determining appropriate outcome measures, collecting and analyzing the data. The measures will be demonstrated, illustrating how they can be incorporated during a clinical session. Outcomes will be outlined with analysis determining significance to show how a supportive back can enhance function versus a back that does not support the pelvis and spine into a neutral position.

### Content references:

- 1) Presperin Pedersen J, Smith C, Dahlin M, Jones J, McKenzie K, Seigny M, Yingling L. Wheelchair backs that support the spinal curves: Assessing postural and functional changes. *Journal of Spinal Cord Medicine*, 2020.online publication, doi: 10.1080/10790268.2020.1760530https://doi.org/10.1080/10790268.2020.1760530
- 2) Presperin Pedersen J, Smith C, Dahlin M, Henry M, Jones J, McKenzie K, Roussel H, Yingling L. Wheelchair backs that support spinal curves: Assessing postural and functional changes. *10/2019100(10);e144-e145.*
- 3) Smith C., Presperin Pedersen J, Henry M, McKenzie K, Yingling L, Roussel H, Dahlin M, Jones J. Proving what we know: Clinical evidence of spinal curve support. In *Proceeding of the 35<sup>th</sup> International Seating Symposium: Bridging the Gap from Data to Value*, March 20-22, 2019 Pittsburgh, PA University of Pittsburgh
- 4) May LA, Butt C, Kolbinson K, Minor R, Tulloch K. Wheelchair back support options: Functional outcomes for persons with spinal cord injury. *Arch Phys Med and Rehab* 2004;85:1146-50. doi: 10.1016/j.apmr.2003.08.105.
- 5) Medola F, Elui V, Santana CD, Fortulan CA. Aspects of manual wheelchair configuration affecting mobility: A review. *J Phys Ther Sci* 2014 Feb;26.2:

313-318. doi:10.1589/jpts.26.313.  
Cited in PMID: 24648656

### **Presenter biography**

Jessica and Cindy have over 80 years of experience combined. Each worked in a large rehab center in the United States, Shirley Ryan Abilitylab and Craig Rehabilitation Hospital. They have had the opportunity to provide clinical wheelchair and seating service delivery, manage a wheelchair and seating clinic, teach and mentor students and young therapist, advocate for legislative and policy change, and conduct research. They have shared their passion for wheelchairs and seating around the world. They are excited to join together to share these findings.

## **A11: C1 South Gold Sponsor**

### **Session:**

## **Facing Forward – What's Up with Head and Neck Supports**

[Stephanie Tanguay OT/L, ATP](#)

### **Abstract**

Many consumers who utilise wheeled mobility require a head support as part of their seating system. A headrest may be utilised as a support for periods of rest or in alternative positions such as tilted or reclined. It can also be an integral part of a power wheelchair with aspects of the drive controls embedded in or attached to the head support. This session will review the geometry of the human skull and its' range of movement and the influence of seated posture on head orientation. The impact of these factors on head support will be presented along with an overview of various products.

### **Presenter biography**

**Stephanie Tanguay** worked as an occupational therapist for 13 years, with a focus on spinal cord injury, seating, and mobility. She also worked as a rehabilitation technology supplier for seven years. She has presented on numerous occasions at the International Seating Symposium, RESNA, the Canadian Seating & Mobility Conference, and the European Seating Symposium. Stephanie has been the clinical education specialist for Motion Concepts since 2006. Stephanie is a native Detroit and a devoted hockey fan (let's Go Red Wings). She has a vast knowledge & experience of seating and wheeled mobility, when she is not teaching, she is most likely to be found beach combing or visiting a National Park.



## D12: Complex Wheelchair Seating and Positioning: The Postural Assessment Process!

Joana Santiago  
Medifab, Sydney, Australia, Clinical Education

### Learning objectives

Upon completion of this session, participants will be able to:

1. List three essential steps when performing a MAT assessment.
2. Identify at least two common postural deviations observed in each plane of motion
3. Describe the appropriate steps in assessing available hip and knee flexion for a seated position.
4. Describe where postural support is required in a wheelchair seating system based on the MAT assessment findings.

### Abstract

Prescribing complex wheelchair seating can be daunting. There are thousands of different solutions to choose from! How can we determine what is the best for our clients, particularly the ones with challenging postural needs? How can we assure the prescribed solution will achieve successful outcomes? Well, the basis for any seating and mobility intervention should be, first and foremost, about the person and their body. We will increase the odds of choosing the right product if we, in fact, perform a comprehensive postural assessment to identify the cause of the postural deviation.

During this interactive session, Joana will facilitate the learning process by breaking down the Assessment Process in small steps, and together with Hammie®, will demonstrate the impact that client's range of motion, joint flexibility, muscle length and skeletal presentation observed on the plinth have on

wheelchair seating angles and postural support requirements.

### Content references:

- 1) Ágústsson A., Sveinsson Þ., Rodby-Bousquet E. (2017). The effect of asymmetrical limited hip flexion on seating posture, scoliosis and windswept hip distortion. *Research in Develop. Disabilities*, 71: 18-23.
- 2) Bach, J. & Waugh, K. (2016). Using Biomechanical Principles in the Management of Complex Postural Deviations in Sitting. Proceedings of the 32<sup>nd</sup> International Seating Symposium, Vancouver, B.C.
- 3) Isaacson, M. (2011). Best practices by occupational and physical therapists performing seating and mobility evaluations. *Assistive Technology*, 23, 13 – 21.
- 4) Kittelson-Aldred T, Sammie WT. (2019). Multi-Joint Muscle Action on the Pelvis. Rehab Management. September.
- 5) Sparacio, J. (2015). The simplicity of complex seating. *NRRTS*, Vol1.
- 6) Waugh, K, and Crane, B. (2013). A clinical application guide to standardized wheelchair seating measures of the body and seating support surfaces (rev. Ed.). Denver, CO. University of Colorado Denver.
- 7) Waugh, K, and Crane, B. (2013). Glossary of wheelchair terms and definitions. Denver, CO. University of Colorado Denver.
- 8) Spinal Seating Professional Development Program. NSW State Spinal Cord Injury Service.  
[www.aci.health.nsw.gov.au/networks/spinal-cord-injury/spinal-seating](http://www.aci.health.nsw.gov.au/networks/spinal-cord-injury/spinal-seating)

### Presenter biography

**Joana Santiago** is the Clinical Educator Manager and the R&D Clinical Lead for Medifab. She completed her degree in Occupational Therapy in Portugal and soon developed a passion for Posture Care and

Wheelchair Seating & Positioning. With 15 years of experience, predominantly dealing with clients with complex postural needs, Joana takes pride in her flexible capability in reaching good clinical outcomes by considering the individual needs, wants and expectations of those she works with. Joana is based in Australia where she primarily assists clinicians by sharing her knowledge and expertise through education and mentoring programs. Furthermore, she has a positive influence on the development, supply, and training of Medifab's extensive range of products.

She is a specialist in her field and has presented at a variety of national and international conferences around the World.

## E10: Tales from the field: Using fully customised seating products

Ms Jenni Dabelstein

Gizmo Rehabilitation, Brisbane, Australia

Physiotherapist/Complex AT Prescriber

### Learning objectives

1. Identify 3 key factors that indicate when bespoke seating products may provide appropriate clinical solutions, in contrast to off-the-shelf solutions.
2. Identify and utilise 3 key strategies for success when prescribing bespoke seating products.
3. Understand processes required to effectively mould and fit bespoke seating products

### Abstract

Fully bespoke, custom-moulded wheelchair seating products have long been available, however accessing them has often required repeat travel to a specialist seating clinic. In current times, custom products manufactured from digitised moulds can be easily created from the field, with the client sitting in their own mobility base, in their own home. This ease of moulding and digitising makes bespoke products now easily accessible to clinicians and clients alike.

While bespoke products are now more accessible than ever off-the-shelf products have become increasingly modular, adjustable and customisable, to better meet the needs of clients with atypical posture and anatomy.

So, for which clients should clinicians consider a fully bespoke system instead of a customisable off-the-shelf item? What are the key strategies for success when using bespoke products, and what are the potential pitfalls? What processes are required, to successfully assess, prescribe, mould and fit bespoke seating? In this presentation, I will describe the process for identifying need, highlight assessment requirements and

provide insight into the moulding and fitting process. This will be informed by case studies from my own clinical practice, including clients with severe global physical impairment as well as clients using active wheelchairs, including sports applications.

### Content references:

- 1) Crane B, Winger MA & Call E. (2016) Orthotic-Style Off-Loading Wheelchair Seat Cushion Reduces Interface Pressure Under Ischial Tuberosities and Sacrococcygeal Regions. Archives of Physical Medicine & Rehabilitation, [Volume 97, Issue 11](#), p1872-1879, available from [https://www.archives-pmr.org/article/S0003-9993\(16\)30080-6/fulltext](https://www.archives-pmr.org/article/S0003-9993(16)30080-6/fulltext)
- 2) da Silva FP, Beretta EM, Prestes RC, Kindlein JW. Design and milling manufacture of polyurethane custom contoured cushions for wheelchair users. Australas Med J [Internet]. 2011 [cited 2015 Oct 22];4(9):500-6. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3562910> PubMed: [PM23393542](#)
- 3) Angsupaisal M, Maathuis CGB and Hadders-Algra M. Adaptive seating systems in children with severe cerebral palsy across International Classification of Functioning, Disability and Health for Children and Youth version domains: a systematic review. Dev Med Child Neurol 2015; 57: 919–931. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/dmcn.12762>

### Presenter biography

**Jenni Dabelstein** is a Physiotherapist who works exclusively as a prescriber and consultant in the area of prescribing complex assistive technology. Her special interests include biomechanics, specialised seating and all types of wheeled mobility, including sports wheelchairs. Jenni has worked within the

disability sector for over 3 decades, in a great variety of roles, including clinical, research, consultancy, education and business roles. She has a depth of knowledge and experience regarding specialised equipment and the industry that surrounds it, as well as a range of formal qualifications. Jenni strives to bring formal assessment together with theory and practical knowledge in order to generate positive outcomes for her clients via the latest assistive technology. As well as running her busy private consultancy, Jenni is a current Board member of ARATA and a National Classifier in the Paralympic sport of Boccia, and continues to present regularly at industry workshops, seminars and conferences.

## E11: Novel method of propulsion pattern recognition in a manual wheelchair simulator

Mr Salman Nourbakhsh, Ms Zeinab Sobhanigavagni, Dr Philippe Archambault  
McGill University, Montreal, Canada

### Learning objectives

1. Upon completion of the session, participants will be able to:
2. Identify four wheelchair propulsion patterns.
3. Understand how DeepLabCut Library was used to extract the wrist position coordinates using a simple webcam.
4. Understand how machine learning technique was used to classify the propulsion type.

### Abstract

**Background.** Propulsion pattern recognition in a manual wheelchair (MWC) simulator contributes to better identify the users' propulsion techniques. It can provide them with appropriate feedback and training, in order to prevent chronic shoulder pain.

**Objective.** The first objective was to track and find the coordinates of the user's wrist in a recorded video. The second objective was to classify the set of wrist coordinates, which is associated with one push cycle, to one out of four possible patterns.

**Methods.** We used a simple webcam to record users from the side view, while they propelled the pushrim. Then, by using the open-source DeepLabCut library, we tracked and extracted the wrist position. Approximately 2000 push cycles were recorded. 80 percent of these data were used to train a machine learning algorithm and the remaining 20 percent were used to test the results, to classify the trials according to four possible propulsion patterns: arcing, semi-circular, single loop over pushrim or double loop over pushrim.

**Results.** We implemented three different machine learning models. First was the baseline naïve bayes, second was the random forest, and finally the last and the best was LSTM. Random forest trained the data faster but with lower accuracy. The accuracy achieved by our wrist tracking and propulsion pattern classification method, using LSTM, was around 90%.

**Discussion.** Three different ML models were implemented: Naïve Bayes as a reference model; Random Forest; and LSTM that outperformed the other models. Random Forest training was faster but resulted in lower accuracy comparing with LSTM model. The effectiveness of X and Y coordinates were evaluated using Random Forest. The Y coordinate resulted in a better performance by a great margin. The prediction was fast enough to be used in real time prediction.

### Content references:

- 1) Slowik, Jonathan S., Philip S. Requejo, Sara J. Mulroy, and Richard R. Neptune. "The influence of speed and grade on wheelchair propulsion hand pattern." *Clinical biomechanics* 30, no. 9 (2015): 927-932
- 2) Slowik, Jonathan S., Philip S. Requejo, Sara J. Mulroy, and Richard R. Neptune. "The influence of wheelchair propulsion hand pattern on upper extremity muscle power and stress." *Journal of Biomechanics* 49, no. 9 (2016): 1554-1561
- 3) Morgan, Kerri A., Susan M. Tucker, Joseph W. Klaesner, and Jack R. Engsberg. "A motor learning approach to training wheelchair propulsion biomechanics for new manual wheelchair users: A pilot study." *The journal of spinal cord medicine* 40, no. 3 (2017): 304-315
- 4) Jayaraman, Chandrasekaran, Carolyn L. Beck, and Jacob J. Sosnoff. "Shoulder pain and jerk during recovery phase of manual wheelchair propulsion." *Journal of biomechanics* 48, no. 14 (2015): 3937-3944

## **Presenter biography**

**Salman Nourbakhsh** is a Ph.D candidate in rehabilitation science at McGill university. His background is in mechanical engineering. He graduated from École de technologie supérieure (ÉTS) based in Montreal in master of science in automated manufacturing engineering in 2016. His passion in health along with his background in Engineering, motivated him to do his Ph.D in an interdisciplinary program, application of robotics in rehabilitation science. Salman wishes to be able to contribute to enhance human quality of life.

## E12: Perceived access to livelihoods among spinal cord injury individuals in Tanzania following Motivation Peer Training

[Annabelle de Serres-Lafontaine<sup>1,2</sup>](#), [Krista Best<sup>2,1</sup>](#), [Charles Batcho<sup>2,1</sup>](#), [Delphine Labbé<sup>3</sup>](#)  
<sup>1</sup>Université Laval, Quebec, Canada. <sup>2</sup>Center for

Interdisciplinary Research in Rehabilitation and Social Integration (CIRRI), Quebec, Canada. <sup>3</sup>University of Illinois, Illinois, USA

[Annabelle de Serres-Lafontaine](#), OT Student and research assistant

[Krista Best](#), Researcher and assistant professor

[Charles Batcho](#), Researcher and associate professor

[Delphine Labbé](#), Researcher and assistant professor

### Learning objectives

Upon completion of the presentation, participants will be able to :

1. Describe the use of the International Classification of Functioning to explore access to livelihoods among individuals with spinal cord injury and what is affecting their inclusion and social participation in their community.
2. Identify personal, occupational and environmental facilitators and barriers to access to livelihoods among individuals with spinal cord injury, increasing our understanding of the challenges these individuals face daily.
3. Define strategies to refine current programming of peer training programs to meet the needs of individuals with spinal cord injury and bring awareness in the communities.

### Abstract

Only 2% of people with disabilities in developing countries have access to basic services rehabilitation<sup>1</sup>. Peer training (PT) and

Entrepreneurial Skills Training (EST) are provided by Motivation (non-profit organization) and Moshi-Cooperative University to enhance independence and occupational engagement of individuals with spinal cord injury (SCI) in developing countries<sup>2</sup>. The purpose of this study was to evaluate the perceived impact of PT and EST on the livelihoods of individuals living with SCI in Tanzania.

**Design.** Qualitative. Participants. Convenience sample of individuals with SCI who received 1-3 PT home visits (advocacy, skin/bladder/bowel care, and wheelchair skills) and 3-days of EST (economic development, entrepreneurship, and savings/support groups). Photovoice procedures. Preparatory workshop; provision of cameras/training; time to capture meaningful photos; selection of 5 best photos and group discussion; captioning photos using 5 standardized questions<sup>3</sup> to convey message. Analysis. Inductive content analysis of photos and captions and grouped according to the International Classification of Functioning.

**Results.** Ten participants (5 females) participated in Photovoice (i.e., participatory community-based approach developed to empower marginalized groups<sup>4</sup> and increase our understanding of the challenges disabled people face daily<sup>5</sup>). Two interrelated themes emerged: 1) **“Influencing factors”**, revealing participants’ inclusiveness in the community influenced by their activities and participation, personal factors (i.e., self-esteem, self-efficacy) and environmental factors; and 2) **“Empowerment”**, explaining participants’ perceptions about advocacy and awareness as well as their hopes for changes and a meaningful life in their community. All participants emphasised the importance of accessibility: while some were able to overcome obstacles (e.g., attend church, see a doctor), others perceived continued inaccessibility inhibited meaningful occupations (e.g., buying/selling at local market).

**Conclusion.** PT and EST had meaningful impact on the lives and livelihoods of individuals with SCI in rural Tanzania. Continued effort to overcome accessibility issues and advocate for their needs may further enhance attainment of gainful occupations.

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#### **Presenter biography**

**Annabelle de Serres-Lafontaine** (OT student) is a graduating student in the clinical master program in occupational therapy at Université Laval and has completed the research profile. She has been a research assistant at Cirris since summer 2019 under the primary supervision of Dr. Krista Best and has completed three research internships for which she received fellowships. Her responsibilities are multiple, including mentoring, active participation in bilingual exchange groups to improve the quality of research at Cirris, participation in various trainings and her involvement in many projects. She has acquired research skills in qualitative and quantitative analysis through literature reviews, file reviews, interviews, focus groups, data analysis and article writing. Her main contributions are for the development of an adapted physical activity toolkit for community organizations in Quebec and the accessibility of services and the confinement experienced by individuals with a spinal cord injury in Quebec and Vancouver.



## E13: Longitudinal analysis of OT students' participation in a wheelchair skills boot-camp

Ed Giesbrecht, Victoria Erives, Jeffrey Coletti  
University of Manitoba, Winnipeg, Canada  
Associate Professor

### Learning objectives

On completion of the presentation, participants will be able to:

1. identify the outcomes of wheelchair skills training with OT students;
2. describe the trends over time between different student cohorts;
3. discuss how skill capacity and confidence relate to clinical practice self-efficacy

### Abstract

Training skills for effective wheelchair use is one of 8 key components outlined as best practice in wheelchair service provision. However, the extent of training provided in rehabilitation is variable, frequently addressing only basic skills [1]. Clinicians identify limitations in knowledge, confidence and capacity to teach and demonstrate these skills as contributing to this disparity [2]. One strategy to ameliorate this issue is improving knowledge, confidence and capacity during entry-to-practice professional programs. A survey of Canadian occupational and physical therapy programs reported only 76% included wheelchair skills training and less than 50% use a standardized curriculum such as the Wheelchair Skills Program [3]. Several studies have reported on the use of pragmatic intensive training workshops, or wheelchair skills "boot camps", in occupational therapy professional programs [4-7]. While these studies report significant improvements, point estimates vary and have wide confidence intervals due to small size single cohorts and variations between bootcamp delivery. Variability may be related to baseline differences and whether change scores are

constant or relative. A Canadian university OT program has conducted wheelchair skill bootcamps for consecutive cohorts since 2013, collecting outcomes on capacity and confidence with skill performance and, more recently, clinical self-efficacy. This presentation will report on analysis of 8 years of data (n= 308) collected from annual bootcamps run at a single site. We will report on more precise outcome estimates; trends and differences across cohorts; differences across skill subsets (basic, intermediate & advanced); relative versus raw score change; change score controlling for baseline; and associations between skill capacity, confidence in skills, and confidence to apply in clinical practice. Findings will be applied to future practice with bootcamp-based education among professions providing wheelchair service delivery.

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## Presenter biography

**Ed Giesbrecht** began working as an occupational therapist in 1994, developing a particular interest in assistive technology and wheeled mobility, serving as clinical specialist in an Assistive Technology clinic in Winnipeg, Canada. His research interest drew him to academia to pursue a master’s and PhD degree. He is an Associate Professor in the department of Occupational Therapy at the University of Manitoba. His research focuses on strategies to address wheelchair mobility skills and training, improving entry-to-practice education, and winter mobility.

## P7: Blind spot sensor systems for power-wheelchairs

Alice Pellichero<sup>1,2</sup>, PhD Krista Best<sup>1,2</sup>, PhD François Routhier<sup>1,2</sup>, PhD Pooja Viswanathan<sup>3</sup>, PhD William Miller<sup>4</sup>

<sup>1</sup>Université Laval, Québec, Canada. <sup>2</sup>Center for Interdisciplinary Research in Rehabilitation and Social Integration (Cirris), Québec, Canada. <sup>3</sup>CEO, Braze Mobility Inc., Toronto, Canada. <sup>4</sup>University of British Columbia, Vancouver, Canada

Alice Pellichero, PhD Candidate

### Learning objectives

At the end of this presentation, participants will be able to:

1. recognize the interest of obstacle detection technology to safe PWC driving
2. determine which PWC users can use a blind spot sensor system in daily life
3. identify individuals needs related to obstacle detection technology

### Abstract

**Introduction.** Blind spot sensor systems can improve power-wheelchair (PWC) safety.

**Objectives.** Compare accuracy of rear obstacle detection in a PWC with and without a sensor system; explore cognitive task load and perceived usability, safety, confidence and awareness; 3) explore PWC users' perceptions in real-world settings.

**Methods.** A mixed-method design was used. PWC users were provided the sensor system. In laboratory setting, accuracy and time of obstacles detection were notified. Twenty-two randomized conditions were completed with and without the sensor system. Cognitive task-load (*NASA-Task Load Index*), perceived usability (*Usability Metric for User Experience-LITE*) and safety, confidence and awareness (Likert-scale) were evaluated. Participants then used the sensor system at home for two-

months before completing semi-structured interviews. Statistical (descriptive, t-tests) and thematic analysis were conducted.

**Results.** Among 11 PWC users (age=67.5±7.5y), obstacles were detected more accurately ( $p<0.001$ ) and rapidly ( $p<0.001$ ) with sensor system than without. Using the sensor system required lower cognitive task-load ( $p=0.005$ ) and was perceived as easy to use. No improvements in safety, confidence or awareness were perceived. Four participants reported continued use after 2 months. Those who discontinued use reported lack of usefulness and technical issues. Three themes emerged: perceived usefulness (improved performance and confidence), barriers to use (technical issues and charge), and recommendations (personalization and design improvements).

**Conclusions.** Sensor systems may improve rear obstacle detection accuracy and time while reducing cognitive task load. However, technical and service improvements have to be made. Users' characteristics, environments and occupations play an important role in using obstacle detection technology.

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<https://doi.org/10.1007/s10514-016-9568-y>.

### **Presenter biography**

**Alice Pellichero** is an occupational therapist. At the beginning of her career she worked in France in rehabilitation centers in neurology services with adults. She is currently conducting a clinical research project as part of the doctoral program in clinical and biomedical sciences at Université Laval (Québec City, Canada). She is attached to the Interdisciplinary Research Center for Rehabilitation and Social Integration (CIRRS) and is under the direction of Dr. François Routhier (CIRRS), Dr. Krista Best (CIRRS) and Dr. Eric Sorita (Bordeaux University). The aim of her research project is to enhance powered mobility device provision through better assessment and training. Realization of this research will lead to the development of a novel PWC driving program that may improve access to PWC mobility for individuals who may have otherwise been excluded. In turn, successful PWC mobility could improve participation and quality of life for the individuals.

## **P8: Getting in Trouble Together: Use of Assistive Technology to Facilitate Toddler Participation**

Rachel Maher

Permobil New Zealand, Auckland, New Zealand

Clinical Education Specialist

### **Learning objectives**

Participants will:

1. Review what participation looks like for typically developing toddlers
2. Hear three case examples of how use of assistive technology has facilitated participation in non-typically developing children
3. Hear feedback from parents about how assistive technology has facilitated participation for their child in family life

### **Abstract**

Toddlers are busy little humans, with research suggesting they are frequently on the move, engaged in play or interacting with the world around them. The therapeutic benefits of early mobility for young people with mobility challenges have been well documented in the research, however the impact on how this mobility impacts on how toddlers participate in family life has not been documented to the same extent.

The Explorer Mini was launched in 2020, with early trials offering delightful stories of toddlers being typical toddlers. These are toddlers who had significant mobility challenges and require assistive technology to obtain age-appropriate mobility, who now have a device that allows them to explore their home, venture to the park with their family, chase the cat and interact with their older siblings, adventures that are familiar to many of us with typically developing children.

As part of the early Explorer Mini trials, feedback has been received from parents who have highlighted what assistive technology has meant to them as a family. An emerging theme of this feedback is how the device has created a shift away from their child being dependent on others, to having periods of being independent and an active participant in family life, becoming the busy little human we know toddlers to be.

In this session we review the impact of assistive devices on how young people participate in their world, including from the perspective of a parent who has experienced firsthand the positive impact assistive technology can have for young people.

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### **Presenter biography**

**Rachel Maher** graduated from the University of Otago in 2003 with a Bachelor of Physiotherapy, and later gained her Post Graduate Diploma in Physiotherapy (Neurorehabilitation) in 2010.

After graduating, Rachel gained experience in inpatient rehabilitation and community Physiotherapy, before moving into a Child Development Service, working with children aged 0 to 16 years.

Rachel developed a passion for seating and mobility while working children, recognising the value of a team approach to wheelchair and seating provision to achieve the best outcomes for end users.

Rachel later moved into a Wheelchair and Seating Outreach Advisor role at Enable New Zealand in 2014, complementing her clinical knowledge with experience in New Zealand Ministry of Health funding processes.

Rachel joined Permobil in June 2020, and is passionate about education and working collaboratively to achieve the best result for our end users.

## **P9: Evaluating clinical outcomes of modular wheelchair seating solutions in Muscular Dystrophy: a case study**

Miss Bridget Churchill

Life for Living Ltd, Dover, United Kingdom.  
Spex Ltd, Christchurch, New Zealand  
Occupational Therapist & Clinical Educator

### **Learning objectives**

1. Identify 3 outcome measures that are relevant for adults with Muscular Dystrophy.
2. Name 5 reasons why seated mobility may be abandoned or under-utilised.
3. Name 4 factors that can influence physical and emotional comfort for wheelchair users

### **Abstract**

A single case study will be presented about a wheelchair user with Muscular Dystrophy over a 2 year period and during the COVID-19 pandemic in the UK. In collaboration with the therapist team, it will highlight the importance of matching person and technology and a person-centred approach.

Body shape distortions are avoidable (Robertson et al., 2016), however progressive neurological conditions can lead to challenges that the wheelchair seating systems and services need to respond to effectively. The value of informed decision-making is evident when optimising postural presentation can be perceived as functionally restrictive or not aligned with wheelchair users' goals or wellbeing – matching the person with technology requires an understanding of these factors (Scherer, Craddock & Mackeogh, 2011) to facilitate the 'bigger picture' for community inclusion.

Selection of the seating system requires a shared perspective to ensure goals relating to comfort, function and posture converge within wheelchair provision for the

wheelchair user and prescribing clinician. Wheelchair seating reviews ideally should be in anticipation rather than in response to deterioration (Richardson et al., 2009). There is added risk of assistive technology abandonment due to progression of health limitations and 'negative factors' (Ravneberg, 2012) if the wheelchair seating system is unable to respond to these changes and service providers unable to plan for anticipate changes.

The impact of Spex modular seating technology was evaluated from initial introduction (transition from existing specialist system) and to present date, taking into considering the impact of the COVID pandemic and additional challenges with 24-hour postural care. Evaluations included visual analogue pain scale, mood assessments, photographs, interviews, Goal Attainment Scale (GAS) and physical measurements.

The decision to use a modular seating system was based on personal choice and will be shown to be appropriate in responding to functional and postural changes to optimise posture, comfort and function.

### **Content references**

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- 2) Richardson, Marion & Frank, Andrew. (2009). Electric powered wheelchairs for those with muscular dystrophy: Problems of posture, pain and deformity. *Disability and rehabilitation. Assistive technology*. 4. 181-8. 10.1080/17483100802543114.
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<https://doi.org/10.3109/09638288.2010.511418>

### **Presenter biography**

**Bridget Churchill** has over 20 years experience with working with adults and older adults with neurological difficulties and additional diagnoses. She has extensive experience in physical rehabilitation and postural care for neurological and adult/elderly populations. Bridget believes that life is for living to the fullest and works with clients to ensure that their goals are the focus and that independence and skills are improved, supporting individuals to problem-solve barriers to their chosen level of participation.



## P10: Meeting Changing Seating Needs Post Hip surgery

[Tracee-lee Maginnity](#)

Permobil, Sydney, Australia,

Clinical Education Specialist

### Learning objectives

1. Attendees will be able to articulate at least one post surgical positioning requirement
2. Attendees will be able to identify at least 2 points of control that were changed within this case example
3. By end of session identify at least two reasons why hip surgery is recommended

### Abstract

Hip surgery is a common procedure encountered within the pediatric population. Hip surveillance studies, 24 hour postural management evidence and orthopedic intervention provides guidance and protocols around prevention and post-surgical positioning. In NSW the hospital will attempt to re configure the existing mobility base and seating to meet discharge requirements or lend equipment from a limited loan pool, but it often falls to the community OT to access alternative equipment to meet the required temporary seating and mobility needs.

This case study follows a young NSW boys' experiences with mobility and seating adjustments through hip and spinal surgical intervention and beyond. We will look at how adjustable modular seating can be configured to meet changing needs, some of the barriers encountered along the way from access to equipment, the funding process and crucial seated position reconfigurations. In an ideal world how would we do things differently? The perspective of the family, client and primary prescribing therapists will be shared during the session.

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- 8) Severe hip displacement reduces health-related quality of life in children with cerebral palsy. Ramstad K, Jahnsen RB, Terjesen T. Acta Orthop. 2017 Apr;88(2):205-210

## **Presenter biography**

**Tracee-lee Maginnity** joined Permobil Australia in July 2019, as a clinical education specialist. Originally from New Zealand, she graduated Auckland University of Technology with a BHSc (Occupational Therapy) in 2003 and has since worked in various roles related to seating and mobility including assessing, prescribing and educating. After gaining experience as an assessor and prescriber at Seating To Go / Wheelchair Solutions in prescribing for both disability and injury, she moved to Australia in 2011 to take on the Senior Occupational Therapist role in a custom moulded seating service. She then worked in clinical consulting and education roles until joining Permobil. Tracee-lee is passionate about maximising functional outcomes with end users and the importance of education within the industry. She has mentored many therapists interested in AT. Her experience includes working with complex postures to achieve custom outcomes.

## **P11: Use of Virtual Boundaries to Facilitate Safer Community Access: A Case Study of Customisation**

Mrs Sandra Malkin, Mr Richard Sutton  
EMHS, Perth, Australia

Mrs Sandra Malkin, Occupational Therapist  
Mr Richard Sutton, Technician

### **Learning objectives**

1. Consider areas in which Geofencing may improve a client's safe and independent community access
2. Outline ways that the safety of community access/involvement may be improved despite reduced supervision resources
3. Demonstrate an understanding of low cost solutions to complex individual client requirements.
4. Have a working knowledge of elements to consider when designing or purchasing similar systems or augmentations.

### **Abstract**

Miss C is a long term powered wheel chair user of over fifty years. She remains fiercely independent, continuing to enjoy exploring her immediate and wider environment and dislikes being contained or supervised by support workers.

The Rehabilitation Technology Unit was approached by the Occupational Therapist working at her care facility who expressed concern about her tendency to wander unsupervised, often becoming lost or stranded. Along with the obvious issues, she was also placing herself and others in danger by crossing nearby busy roads with little regard to traffic.

Using a concept called Geofencing, the Rehabilitation Technology Unit was able to set up two virtual GPS monitored perimeters- A hard and a soft boundary. The area within the

soft boundary was the safe zone where Miss C was free to roam as she pleased. The area between the hard and soft boundaries acted as a warning buffer and the area outside the hard boundary was a no go zone where the chair was automatically disabled.

In addition to the chair being disabled, as Miss C attempted to travel outside of the 'warning zone' staff were notified via SMS. The notification SMS included a map showing the chair's location in the event that she needed 'rescuing' or the chair needed reactivating. Prior to crossing the "hard boundary" and leaving the safe zone, Miss C was warned that she was approaching a hard boundary, with an audible warning saying that she needed to return to the safe zone and the chairs functionality was greatly reduced

Using an innovative and individualised participant centred approach, this system has enabled Miss C to continue to connect with her local community, given her added independence, and improved the safety of herself and others.

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## **Presenter biography**

**Sandy Malkin** completed her Occupational Therapist degree at Curtin University in Perth, Australia. She has worked predominantly in Perth in a variety of settings, but also spent several years working and travelling in the United Kingdom and the United States of America.

Her primary focus has been in the area of adult rehabilitation, particularly working with clients with spinal cord injury. She is currently working at the State Rehabilitation Service in Perth within the Rehabilitation Technology Unit. She specialises in complex seating within powered wheelchairs, and embracing current and emerging technology to enable individuals with significant disability to operate their powered wheelchair via alternate control systems.

**Richard Sutton** has spent his working life accumulating transferable skills and knowledge from various trades and professions. He has worked and or gained qualifications in fields as diverse as automotive mechanics, Data/communications networking, Environmental science and Shotfiring (explosives) to name but a few.

He is currently in a technical role supporting occupational therapists at the state rehabilitation service of Western Australia. He uses his broad and unique skill set to find solutions to the complex needs of individuals with a difference and thrives on the challenges this presents

## **A12: Supporting psychological wellness in children and families with disabilities / medical conditions: reflections from paediatric practice. (90min INTERACTIVE SESSION)**

Nicola McDonald, Helen Thorne  
CDHB, Christchurch, New Zealand  
Nicola McDonald, Child Health Psychologist  
Helen Thorne, Senior Physiotherapist and  
Physiotherapy Team Leader, Canterbury Child  
Development Service

### **Learning objectives**

Participants will:

1. Strengthen their understanding of the psychological and emotional challenges children with disabilities / chronic medical conditions may experience.
2. Strengthen their understanding of the family experiences of disability/chronic medical conditions, especially at important points of the care journey.
3. Learn practical ways to support children and families in this sphere and when to seek extra support around psychological and emotional wellbeing.

### **Abstract**

Children with disabilities / chronic medical conditions and their whanau face a unique set of challenges. In this presentation common psychological and emotional difficulties experienced by this population will be discussed. We will explore the impact these can have on children and their whanau, and the complex interactions between psychological and physical factors (including pain). We will talk about issues arising at different life stages including when children transition into wheelchairs, trial new equipment or experience progression of their

condition. The concepts of chronic sorrow and grief will be used to explore family journeys.

Together we will reflect on some case examples and discuss practical strategies for supporting the psychological wellbeing of children and families we are working with. Indicators for seeking further support for families will also be outlined.

### **Content references:**

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- 5) Young S, Shakespeare-Finch J, & Obst P (2020) Raising a child with a disability: a one-year qualitative investigation of parent distress and personal growth. Disability & Society 35 (4), 629-653

### **Presenter biography**

**Nicola McDonald** has been a Child and Family Psychologist in Christchurch for nearly ten years, the last five of which have been in

Christchurch Hospital's paediatric department as a Child Health Psychologist. She primarily supports children and young people experiencing psychological difficulties which link to their medical conditions/disabilities. She provides assessment and individual, family and group intervention. Nicola has special interests in anxiety and pain and works closely with colleagues from the Child Development Service. She holds a Masters of Child and Family Psychology (First Class Hons) and lectures on Canterbury University's Child and Family Psychology Programme.

**Helen Thorne** is physiotherapy Team Leader at the Child Development Service, CDHB. She has 20 years' experience working with children and adults with health conditions and disabilities, and has a Post-graduate Diploma in Rehabilitation. Helen provides therapy, equipment and seating solutions for children/young people newborn-16 years of age, working within an interdisciplinary team. Helen supports staff within CDHB Child Development Service as well as West Coast DHB and local adult services, providing supervision, teaching and advice, especially in the areas of physiotherapy management, complex seating, and lying supports. She is a member of the Enable NZ panel reviewing clinician's case studies for accreditation in Wheeled Mobility and Postural Management.

Helen and Nicola are both passionate about working with children/young people and their families, and supporting them to achieve their goals.

## **B10: Moving towards guided self-assessment and personal budgets for seating and mobility equipment: Through the lens of Enabling Good Lives. (90 min INTERACTIVE SESSION)**

[Cath Williams](#), Portfolio Manager Disability Directorate, NZ Ministry of Health  
[Rachael Burt](#), Director, Disabled People and Whanau Supporting Mana Whaikaha  
[Natasja Chapman](#) –Operations Director, Enable New Zealand

### **Presenter biography**

**Cath Williams**, Portfolio Manager Disability Directorate, Ministry of Health. Being an Occupational Therapist has informed my work as a Manager of Rehabilitation services and Assistive Technology services, in Australia, over 30 years.

Since returning to New Zealand, 8 years ago, I led the design, procurement and implementation of ACC's Disability services, Living my Life. I am currently the Portfolio Manager managing the Equipment and Modification Services in the Disability Directorate, Ministry of Health.

I believe that people are the holders of knowledge about what is important to them to achieve the outcomes needed to engage in their chosen life roles. I am committed to the removal of barriers to participation and the rollout of Enabling Good Lives – Disability transformation.

**Rachael Burt**, Director, Disabled People and Whanau Supporting Mana Whaikaha

Tēnā tātou katoa,

I'm Rachael the Director of Mana Whaikaha.

Mana Whaikaha is the prototype in the MidCentral region that was co-designed with community to prototype a transformed approach to the Disability Support System, based on the Enabling Good Lives Vision and Principles.

Prior to Mana Whaikaha, I have had the honour of working in the Disability Sector for over 20 years in varying roles including working in Enable NZ, Needs Assessment and Service Coordination and a National Disability Support Provider.

As someone who identifies as a Disabled Person, I have been excited to support the development of removing environmental barriers, through and Enabling Good lives approach, working towards a fully inclusive society where disabled people are leaders of their own lives.

**Natasja Chapman** has been with Enable New Zealand since August 2017. Prior to taking up her current role as Director, Operations, she held the position of Enable New Zealand's Service Manager for Housing. Natasja has previously held positions at the Ministry of Business Innovation and Employment and also at Immigration New Zealand Palmerston North, where she held several roles including Operations Manager for four years. She has also been part of the project considering how Equipment can be accessed via personal budgets, in the context of transforming the disability sector.

## C12: Exploring power mobility use – a learning approach for children and adults with cognitive impairment

Lisbeth Nilsson

Associated to Lund University, Sweden  
Occupational Therapists

### Learning objectives:

1. Discuss why it is a powerful activity to explore power mobility use
2. Explain possible benefits of exploring power mobility use ahead of ability to drive goal-directed
3. Motivate application of the ALP tool for assessment and facilitation of tool use learning

### Abstract

If children and adults with multiple and complex disabilities involving cognitive impairment, are given opportunities to explore power mobility experiences, their consciousness of tool use can grow. Power mobility devices are powerful mediators of experiences promoting development and learning. Exploring possible effects of acting on joystick or switch/es operating the device, offers the user a variety of effects, sensations and learning experiences impacting body and relations to environment.

The ALP tool originates from research projects carried out by Nilsson (Driving to Learn) and Durkin (Moving forward). Both projects focused on gaining understanding of the learning process and how to facilitate tool use learning through power mobility experience. The ALP tool includes the ALP-instrument for assessment of the eight phases and three stages in the learning process, and the ALP-facilitating strategies guides the approach for each phase and stage in the process. The ALP is process-based as it connects assessment of a user's actual phase in the tool use learning process with appropriate facilitating strategies for each phase and stage. Assessment and

facilitation is carried out in real context and set up for each individual's abilities, needs and possible motives. Assessment is based on observation and interpretation of learner performance in the moment and facilitation is aiming at providing the just right challenge at each moment of an intervention situation.

Elucidating possible learning benefits in earlier phases of the learning process can assist clinicians who wish to use powered mobility as a learning experience. The learning approach Assessment of Learning Powered mobility use supports recognition of minor changes in performance indicating small successes and steps forward ahead of reaching goal-directed driving. It also guides how to facilitate this progress at each of the phases in the process. Using the full ALP is emphasized as a pre-requisite for successful outcome.

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### **Presenter Biography**

**Lisbeth Nilsson** is a PhD and specialist in occupational therapy and associated researcher of Occupational Therapy and Occupational Science at Lund University, Sweden. She developed the intervention Driving to Learn™ in powered wheelchair for people with profound cognitive disabilities. Her special interests are tool use learning and assessment and facilitation of the learning process. She and her collaborator Durkin, PhD and OT, UK, developed the Assessment of Learning Powered mobility use (ALP).

Her current focus is implementation of the ALP tool in powered mobility intervention and other fields of assistive technology. She is actually collaborating and carrying out research nationally and internationally with OTs, PTs and SLPs; and she has presented and published her findings worldwide since 1998.

## D13: Time for a Switch: The Evaluation of Non-Proportional Drive Controls

Mr John "Jay" Doherty

Pride Mobility Products Corporation, Exeter, PA, USA

Director Clinical Education

### Learning objectives

1. Participants will apply the hierarchy of drive controls to the selection of non-proportional drive control selection.
2. Participants will explain 2 programming features available for non-proportional drive controls that can increase independence and maximize function.
3. The Participant will discuss 2 options for controlling power seat functions when utilizing non-proportional input devices.

### Abstract

There are many considerations to make when assessing an individual for power mobility use. The decisions made will impact not only the individual's mobility, but also how they reposition themselves, interact socially, and access their environment. There are many options for non-proportional drive controls on the market today, so how does the therapist and supplier choose the correct device when a proportional device is not an option? This course will review the hierarchal decision tree to allow the participant to understand how to decide which non-proportional input device is best for the individual they are working with. The course will use videos and case studies to assist in showing actual devices being utilized.

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### Presenter biography

**Jay Doherty** has 26 years of experience working in the assistive technology field with a concentration in complex rehab technology. As the director of clinical education at Quantum Rehab, Jay presents nationally and internationally on seating and wheeled mobility, focusing on evaluation and application of available technologies.

Before joining Quantum, Jay worked in both rehabilitation and assistive technology settings. His expertise ranges from pediatrics to adults. His presentations reflect a strong emphasis on different technology interventions. Jay currently sits on the Mobility Management Editorial Board and holds his ATP and SMS certifications from RESNA.

## D14: Physical risk factors influencing wheeled mobility in children with cerebral palsy

Mrs Jackie Casey<sup>1,2</sup>, Associate professor  
Elisabet Rodby-Bousquet<sup>1,3</sup>  
<sup>1</sup>Lund University, Lund, Sweden. <sup>2</sup>Belfast Health & Social Care Trust, Belfast, United Kingdom. <sup>3</sup>Centre for Clinical Research, Västerås, Sweden  
Mrs Jackie Casey, Advanced Practitioner Occupational Therapist  
Associate professor Elisabet Rodby-Bousquet, Physiotherapist

### Learning objectives

Upon completion of this presentation, participants will be able to:

1. Describe what ratio of children with cerebral palsy independently use manual wheelchairs indoors or outdoors
2. Recognise that the majority of children with cerebral palsy do not independently self-propel a wheelchair
3. List at least 2 risk factors for not being able to independently use wheeled mobility indoors or outdoors
4. Compare how many children with cerebral palsy use manual and powered mobility outdoors

### Abstract

**Background:** There is a lack of understanding of the factors that influence independent mobility and participation in meaningful activities. The purpose of this study was to analyse physical factors influencing independent use of manual and power wheelchairs in a total population of children with cerebral palsy (CP).

**Methods:** A cross-sectional study based on the most recent examination of all children with CP, born 2002–2013, reported into the Swedish cerebral palsy registry (CPUP), from

January 2012 to June 2014. There were 2328 children (58 % boys, 42 % girls), aged 0–11 years, at all levels of gross motor function and hand function. Hazard ratios adjusted for age and sex were used to calculate the risk for not being able to self-propel based on Gross Motor Function Classification System (GMFCS) levels, upper extremity range of motion and hand function including Manual Ability Classification System (MACS), House functional classification system, Thumb-in-palm deformity, Zancolli (spasticity of wrist/finger flexors) and bimanual ability.

**Results:** In total 858 children used wheelchairs outdoors (692 manual, 20 power, 146 both). Only 10 % of the 838 children self-propelled manual wheelchairs, while 90 % were pushed. In contrast 75 % of the 166 children who used power mobility outdoors were independent. Poor hand function was the greatest risk factor for being unable to self-propel a manual wheelchair, while classification as GMFCS V or MACS IV-V were the greatest risk factors for not being able to use a power wheelchair independently.

**Conclusions:** The majority of children with CP, aged 0–11 years did not self-propel manual wheelchairs regardless of age, gross motor function, range of motion or manual abilities. Power mobility should be considered at earlier ages to promote independent mobility for all children with CP who require a wheelchair especially outdoors.

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## **Presenter biography**

**Jackie Casey** works as an Advanced Practitioner Occupational Therapist in specialised seating in the Rehabilitation Engineering Centre, a regional service for Northern Ireland. Employed 3 days per week in this service by Belfast Health & Social Care Trust. Here I guide local therapists into interpreting postural assessments into optimal wheelchair seating systems that enable persons with complex physical disabilities and their families (where appropriate) to optimise their ability to independently function, engage in everyday life, and have fun.

Currently studying 2 days/ week on PhD with Department of Clinical Medicine – Orthopaedics, Lund University. Undertaking registry-based research with a population of Swedish children with cerebral palsy (CP) aged birth to 18 years. Primary focus of my research is an exploration of the relationship between postural asymmetries, deformities and contractures, pain, and ability to change position upon supine lying, sitting and independent wheelchair mobility of these children.

## D15: Power-wheelchair users with severe cognitive impairment can improve their capacities

Alice Pellichero<sup>1,2</sup>, PhD Lisa Kenyon<sup>3</sup>, PhD Krista Best<sup>1,2</sup>, PhD Éric Sorita<sup>4</sup>, PhD François Routhier<sup>1,2</sup>

<sup>1</sup>Université Laval, Québec, Canada. <sup>2</sup>Center for Interdisciplinary Research in Rehabilitation and Social Integration (Cirris), Québec, Canada. <sup>3</sup>Grand Valley State University, Grand Rapids, USA. <sup>4</sup>Université de Bordeaux, Bordeaux, France, PhD Candidate

### Learning objectives

At the end of this presentation, participants will be able to:

1. describe power wheelchair training approaches applicable for users with cognitive impairment
2. discuss whether a future power wheelchair user has learning potential
3. discuss how learning potential may be considered in terms of anticipating improvements in PWC performance

### Abstract

**Introduction.** Power-wheelchairs (PWC) facilitate mobility, occupational engagement and social participation. Training future PWC users during PWC provision is a recommendation from the World Health Organization. However, individuals with cognitive impairment may be precluded from PWC provision before they get a chance to benefit from training.

**Objectives.** Identify PWC training approaches available to individuals with cognitive impairment; and explore the influence of training on PWC capacities and on cognitive scores for PWC users with cognitive impairment.

**Method.** A systematic review of the literature was realized (MEDLINE, CINAHL, EMBASE, PsycINFO, Web of Science). Studies (inclusive

of research designs) including PWC users (all ages) who received PWC training and reported PWC capacities and cognitive scores. Two authors independently screened study eligibility. Levels of evidence (*Oxford Center for Evidence-Based Medicine*) and methodological quality (*Mixed-Methods-Appraisal-Tool*) were noted. (PROSPERO, CRD42019118957)

**Results.** Ten studies were included, including two randomized control trials and six single research design. Five included children and two included older adults. Seven PWC training approaches were identified (from the most standardized to the most individualized). The ten studies reported significant improvements of PWC capacities after PWC training. Four studies presented that the cognitive scores also improved after training.

**Conclusion.** Acknowledging that individuals with severe cognitive impairment can improve their PWC capacities, people with severe cognitive impairment could not be precluded to PWC provision before they get a chance to improve their capacities. Next steps in research will be to identify the best learning strategies to train future PWC users with cognitive impairment.

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### **Presenter biography**

**Alice Pellichero** is an occupational therapist. At the beginning of her career she worked in France in rehabilitation centers in neurology services with adults. She is currently conducting a clinical research project as part of the doctoral program in clinical and biomedical sciences at Université Laval (Québec City, Canada). She is attached to the Interdisciplinary Research Center for Rehabilitation and Social Integration (CIRRIS) and is under the direction of Dr. François Routhier (CIRRIS), Dr. Krista Best (CIRRIS) and Dr. Eric Sorita (Bordeaux University). The aim of her research project is to enhance powered mobility device provision through better assessment and training. Realization of this research will lead to the development of a novel PWC driving program that may improve access to PWC mobility for individuals who may have otherwise been excluded. In turn, successful PWC mobility could improve participation and quality of life for the individuals.

## **E14: Permobil Platinum Plus Sponsor's session:**

### **Understanding the Design of Manual Wheelchairs from an Engineer's Perspective.**

#### **Presenter Biography**

**Samuel Baker** (B.Eng., MIEAust) is part of the Permobil APAC team in the role of Product Manager, specialising in Manual Wheelchairs and Power Assist Devices. Trained as a medical engineer with further studies in biorobotics, he started his career in the hospital and government setting before joining the assistive technology industry in 2015. Previous roles have included business development manager and product specialist where he developed a broad range of knowledge and passion for training and education.

Equally happy being hands on with products, past career highlights have included the opportunity to provide technical support for athletes at global para-sports events such as the Commonwealth and Invictus Games.

Outside of work Sam enjoys hiking, pulling things apart to figure out how they work, martial arts, and spending time with friends and family.

## E15: Use of activity chairs/standing aids by people with disabilities: results from a Master thesis.

Naja Tidemann<sup>1,2</sup>, Ph.D. Erika G. Spaich<sup>1</sup>  
<sup>1</sup>Neurorehabilitation systems group,  
Department of Health Science and  
Technology, Aalborg University, Aalborg,  
Denmark. <sup>2</sup>VELA - Vermund Larsen A/S,  
Aalborg, Denmark  
Naja Tidemann, PhD student  
Ph.D. Erika G. Spaich, Associate Professor

### Learning objectives

1. Have knowledge of the purpose of the activity chair and the standing aid.
2. Describe areas of use of the activity chair and the standing aid as well as the benefits of using these assistive technologies when performing activities of daily living by people with disabilities.
3. Discuss the users' satisfaction with these assistive technologies.

### Abstract

**Background:** In Denmark 750,000 adults live with varying degrees of limited functionality due to mobility impairments. Municipalities grant them large quantities of assistive technologies, including activity chairs and standing aids, to alleviate the consequences of their impairments (1,2). The purpose of the activity chairs and standing aids is to improve the mobility and enhance the capability of the users to engage independently in activities of daily living.

**Objective:** To investigate the areas of use of the activity chair and the standing aid as well as the impact of using them when performing activities of daily living by people with disabilities living at home. Furthermore, to evaluate the level of user satisfaction.

**Methods:** Empirical data was collected from 22 users with two standardized research tools. IPPA (3,4) was used to gather

information regarding the areas of use and the difficulty to perform activities of daily living from five users and part A of QUEST 2.0 (5, 6, 7) was used to evaluate user satisfaction by 17 other users.

**Results:** Regarding the areas of use, the activity chair and the standing aid were used in relation to 13 activities, among them cooking at the kitchen table, emptying and filling the dishwasher and the washing machine, and taking food in and out of the refrigerator. There was an overall improvement of the IPPA score when using these two assistive technologies during 2-4 weeks (20,83 [20 – 21] score before; 11 [10 – 11,25] score after, expressed as median [25 % - 75% quartiles]). Users ranked the level of satisfaction with the activity chair and the standing aid between satisfied and very satisfied.

**Conclusion:** The activity chair and the standing aid had a positive impact on helping users in their activities of daily living, which resulted on them being satisfied or very satisfied with their assistive technology.

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## Presenter biography

**Naja Tidemann** (ntj@hst.aau.dk) has a bachelor degree in Occupational Therapy from University College of Northern Denmark (UCN) from 2014 **and** a MSc in Clinical Science and Technology from Aalborg University from 2017. She is currently employed at VELA – Vermund Larsen A/S and is enrolled as a PhD student at Aalborg University - Department of Health Science and Technology, Denmark. Her research interest is in the field of assistive technology and is currently working on a research project concerning effect measurements of activity chairs for people with disabilities.

## E16: Tales from the field: My love affair with smart electronics.

Ms Jenni Dabelstein

Gizmo Rehabilitation, Brisbane, Australia,  
Physiotherapist/Complex AT Prescriber

### Learning objectives

1. Identify 3 key factors that indicate when smart electronics may enhance power wheelchair function and/or safety for power wheelchair users or carers.
2. Understand 3 clinical applications of smart electronics to enhance clinical outcomes.
3. Be able to utilise processes at assessment and fitting, to effectively prescribe and integrate smart electronic functions.

### Abstract

Over the past 5 years, it has become much more common to prescribe power wheelchairs with multiple power seating functions, including tilt-in-space, backrest recline, legrest elevate and seat elevate. Hardware and software options are available that allow users even with severe physical impairments to both drive a power wheelchair and access power seating functions. The benefits of self-determination in mobility are now accepted as wide reaching, so shared control and supervised driving scenarios are also becoming more common. However, with complexity of power wheelchairs functions comes complexity of chair operations, which can make generating consistent and positive clinical outcomes more challenging.

My own experience is that, while complex power wheelchairs potentially offer incredible functionality, in practice they can be somewhat intimidating and overwhelming. This is particularly the case for users with any degree of cognitive impairment, where the use environment is

often quite risk-averse and any mishaps may result in reduced opportunities for self-drive. Fortunately, in tandem with proliferation of advanced power wheelchair functions has come an array of smart electronic features that simplify operations and enhance safety. These include through-drive controls, memory seating, programmable smart actuators, both automatic and programmable safety features and advanced programming options. In my own clinical practice, I have fallen a little in love with smart electronics and regularly use smart features and programming to simplify operations for users and carers, and help to generate more consistently positive clinical outcomes. In this presentation I will explore some smart electronic features that I use regularly to make chair operations easier, simpler and safer for users and carers alike.

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## **Presenter biography**

**Jenni Dabelstein** is a Physiotherapist who works exclusively as a prescriber and consultant in the area of prescribing complex assistive technology. Her special interests include biomechanics, specialised seating and all types of wheeled mobility, including sports wheelchairs. Jenni has worked within the disability sector for over 3 decades, in a great variety of roles, including clinical, research, consultancy, education and business roles. She has a depth of knowledge and experience regarding specialised equipment and the industry that surrounds it, as well as a range of formal qualifications. Jenni strives to bring formal assessment together with theory and practical knowledge in order to generate positive outcomes for her clients via the latest assistive technology. As well as running her busy private consultancy, Jenni is a current Board member of ARATA and a National Classifier in the Paralympic sport of Boccia, and continues to present regularly at industry workshops, seminars and conferences.

## A13: Supporting the growth and development of wheelchair and seating therapists: a coaching approach

Mrs Maria Whitcombe-Shingler, Ms Alexandra Haydon

ADHB, Auckland, New Zealand

Mrs Maria Whitcombe-Shingler, Educator  
Ms Alexandra Haydon, Wheelchair & Seating Therapist

### Learning objectives

1. Have been introduced to coaching tools and techniques used to facilitate growth and development of wheelchair and seating therapists
2. Learn and apply the GROW model of coaching
3. Practical tips for effective coaching sessions.

### Abstract

From novice to expert, the journey of wheelchair and seating training can be a long and challenging journey. This session will be offering participants the opportunity to learn about coaching principles, models and tips, and the lived experience of applying these. As clinicians in a field with increasing demand and funding complexities, the need to work effectively to achieve positive outcomes for our clients whilst avoiding feeling overwhelmed and frustrated was recognised.

The use of mentoring as opposed to preceptoring and the use of a coaching model in conjunction with other models of training and supervision has been effective in building skill and confidence. The learning with these approaches could be useful to other services. Supporting and valuing individual team members, understanding the client population and context, and focussing on client outcomes have led to a focus on coaching, support and empowerment. This is alongside enabling therapist participation in the New Zealand wheeled mobility and

postural management competency framework training, tasks, and formal case studies.

The essential components of effective coaching using the GROW coaching model can be a powerful catalyst for change. With therapists on the ground identifying the possible solutions, success can come from listening, exploring and supporting ideas in a structured and safe framework.

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### **Presenter biography**

**Maria Whitcombe-Shingler** graduated as an occupational therapist from CIT, Upper Hutt. She has worked in a range of hospital school and community settings and has clinical, teaching and supervisory experience. She has worked at Mobility Solutions since its inception in 2000. Maria is a reflective practitioner, and completed her Masters research (Otago Polytechnic) using qualitative methodology to look at adult users' experiences and perspectives of using multifunction power wheelchairs in Aotearoa, New Zealand.

**Alexandra Haydon** graduated from the Auckland University of Technology in 2018 with a Bachelor of Health Science Majoring in Occupational Therapy. After graduating, Alex gained experience in adult community occupational therapy, before joining Mobility Solutions in 2021 on a rotational programme.

## A14: Can user centered design be used to develop assistive technology? Testing a framework for collaboration

[Miss Hana Phillips, Associate Professor Gianni Renda, Professor Rachael McDonald](#)  
Swinburne University, Melbourne, Australia  
Miss Hana Phillips, Occupational Therapist

### Learning objectives

1. For participants to be exposed to current design methodologies and how these may run in parallel with current practices within both healthcare and with development of assistive technologies
2. For participants to experience current design methodologies and trial a collaborative framework in a safe space
3. For participants to have an opportunity to reflect on their own practices and the proposed framework and whether they can see the benefits of further interdisciplinary practice to start conversations for further interdisciplinary opportunities and gaps in the research.

### Abstract

**Introduction:** There is growing evidence that there is a need for change in the approach to Assistive technology (AT), to reduce the levels of abandonment in the community and improve quality of life for the users of AT. Alongside this, healthcare professionals are interacting with design professionals to solve complex issues within healthcare on an increasingly frequent basis. Examples of this include areas of oncology, hospital design and dementia care. However, there has been limited research into human centered design with the collaboration of users of AT, health care professionals and designers. As there is growing evidence that collaboration between the users of AT, as well as health care

professionals and design professionals utilising a human and user centered design approach may be of benefit to the users of AT and reduce the abandonment of AT.

**Method:** To further engage with this topic, users of AT, healthcare professionals and designers have participated in research to understand the current understandings of human centered design and collaboration in this space of AT design and inter-professional practices. This data was then used to formulate a framework to implement user and human centered design within the field of AT. This framework was developed to address the areas of difficulty presented and to mitigate these issues. This framework will be demonstrated and run as a pilot to ensure it's suitability prior to being used within the community.

**Result:** After trialing of this methodology, it will be adapted and used within the community to provide a use case for the interdisciplinary collaboration of users of AT, designers and healthcare professionals. This will assist in both understanding the potential role of human centered design in the area of AT and promoting the interactions between user centered and client centered practice within the AT community.

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### **Presenter biography**

**Hana Phillips:** Hana's has a background in Occupational Therapy and rehabilitation, with an interest in adults and disability. With broad experience within the public and private health sectors, her interests include adaptive technology and environmental design and modification. This led to working on a PhD in understanding how design principles, specifically user centred design and design thinking may improve the utility of aids and improve personal independence as well as decrease long term abandonment.

**Gianni Renda:** Associate Professor Gianni Renda is Deputy Chair of the Department of Architectural and Industrial Design. His research focus is investigating ways that design can empower the user in the field of health, disability and ageing. Other interests include food design, advanced manufacturing, Italian design history and automotive design. Gianni has worked professionally as a graphic designer, retoucher, printer, exhibition and set designer.

**Rachael McDonald:** Associate Professor Rachael McDonald is a clinical, research and teaching Health Professional with an interest in enabling people with lifelong disabilities to participate in life situations. She has worked extensively in this field, with in both children's services and adult settings. She supervises research (honour's, MSc and PhD) students specialising in the care of people with complex disability as well as development and evaluation into the effectiveness of assistive technologies, and has published widely. She has qualifications in occupational therapy, biomechanics and higher education in addition to her Doctorate which was an exploration of the acceptability and

effectiveness of adaptive seating systems in wheelchairs for children with cerebral palsy. She previously held a joint appointment with the Department of Occupational Therapy and the Centre for Developmental Disability Health Victoria at Monash University. Her role at CDDHV included health professional education and leading research activities, whereas her interest in using technology as an enabler but also as a tool for collecting objective evidence was a feature of her occupational therapy research. This interest has led to her recent appointment as the Chair, Department of Health and Medical Science at Swinburne University of Technology, where this research is developing further.

## **B11: Permobil Platinum Plus Sponsor Session:**

### **Smart Drive: New Updates and their Clinical Applications**

#### **Presenter Biography**

**Samuel Baker** (B.Eng., MIEAust) is part of the Permobil APAC team in the role of Product Manager, specialising in Manual Wheelchairs and Power Assist Devices. Trained as a medical engineer with further studies in biorobotics, he started his career in the hospital and government setting before joining the assistive technology industry in 2015. Previous roles have included business development manager and product specialist where he developed a broad range of knowledge and passion for training and education.

Equally happy being hands on with products, past career highlights have included the opportunity to provide technical support for athletes at global para-sports events such as the Commonwealth and Invictus Games.

Outside of work Sam enjoys hiking, pulling things apart to figure out how they work, martial arts, and spending time with friends and family.

**Rachel Fabiniak** began her studies at The Georgia Institute of Technology, where she graduated with her Bachelor of Science in Biology in 2009. Rachel then went on to receive her Doctorate in Physical Therapy from Emory University in 2013.

After receiving her doctorate, Rachel went into clinical practice as a physiotherapist in the Spinal Cord Injury Day Program at Shepherd Center in Atlanta, Ga. There she developed a passion for seating and mobility which ultimately led to her career with Permobil in 2018. In 2020, Rachel became Director of Clinical Education for Asia-Pacific.



## B12: Get me out of here, Manual Wheelchair Power add on Devices

Mr Mitchell Stone

Sunrise Medical, Sydney, Australia, Product specialist

### Learning objectives

1. Have a good understanding of considerations regarding add on devices.
2. Be able to establish various options available in regards to features and considerations of each
3. Have increased confidence which may help decide which product is going to be suitable for the end user

### Abstract

This highly engaging workshop will describe the diverse equipment available to manual wheelchair users to get out in the community. We'll also discover what add on devices make it possible to visit places that would otherwise be too difficult to access. The workshop will cover options that can be attached to a user's manual wheelchair, what to look out for when scripting these products and restrictions that may apply to both the wheelchair and add on devices. Benefits of the use of power add on devices will be covered as well as how it can help users interact in the community; getting them out and about without the fear of being "stuck".

Products available on the market, such as Smart Drive, Smoov, Freewheel, Front Wheel, Batec, F55, Street Jet, Claxon, Tri-Ride, Extender, I-Express, E-fix, E-motion will be reviewed including their and unique applications and benefits.

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power-assisted wheelchair. *Clinical Rehabilitation*, 27(4), pp.299-313. A systematic review on the pros and cons of using a pushrim-activated power-assisted wheelchair

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### Presenter biography

**Mitch Stone** joined Sunrise Medical at the start of 2021 as the RGK product specialist. He has a passion for maximising function and skills for both new and old wheelchair users. He knows the difference a millimetre can make in a perfect set up. Mitch has been a manual wheelchair user since 2010 and brings a breadth of both practical and technical experience to his role. Prior to joining the assistive technology industry, Mitch work in the trade industry where millimetres also made a difference.

Mitch plays both basketball and wheelchair rugby league. He has represented Australia in the League competition and is striving to play on the international stage again in 2021. His skills on the court provide him with an expert

insight and understanding the essential needs when scripting elite chairs for athletes.

Mitch enjoys mentoring and upskilling wheelchair users, helping them to maximise their daily function and participation both in the community and on the field.

## C13: The measurement of postural asymmetry in non-ambulant adults with cerebral palsy

CHOLMES<sup>1,2</sup>,

<sup>1</sup>Monash University, Peninsula Campus, Melbourne, Australia; <sup>2</sup>St. Vincent's Hospital Melbourne, Melbourne, Australia

### Learning objectives:

Upon completion of this session participants will be able to:

1. Identify factors impacting postural asymmetry and lifespan care in non-ambulant adults with cerebral palsy
2. Understand the use of the Goldsmith Indices of Body Symmetry in the measurement of postural asymmetry of the thoracic cage, pelvis and hips
3. Understand the interpretation of GlofBS results and the significance for postural monitoring and therapeutic interventions

### Abstract

Postural deformities affecting the spine, pelvis and hips are common in non-ambulant adults with cerebral palsy (CP). Despite the relatively static nature of CP, the postural asymmetries in CP are noted to be progressive affecting many domains of health and functioning. Secondary impairments are common in the more severely affected adults with complex disabilities with the effects of ageing and functional decline occurring earlier in adults with CP than the general population..

Consistent and reliable clinical measurement of posture and the impact of interventions is challenging, with radiographic studies proving difficult for those with contractures and/or behavioural or movement disorders. The Goldsmith Indices of Body Symmetry (GlofBS) is a simple clinical measurement tool which captures quantitative objective data of rib cage shape, pelvic alignment and hip orientation providing a three-dimensional understanding of the rotary nature of these asymmetries. The GlofBS, using customised measurement apparatus, captures the

segmental inter-relationships of the thoracic cage, pelvis and hips, thus providing a clinical approach to aid in problem solving complex seating and bed positioning requirements. Issues related to the progression of postural asymmetry of the thoracic cage, pelvis and hips will be discussed using a case study to highlight the utility of the GlofBS. Objective measurement of postural asymmetry using the GlofBS will be demonstrated providing a practical overview of the process. Videos demonstrating use of the tool with a young adult with a complex disability will further enhance understanding of the measurement process inclusive of clinical interpretation of the results.

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#### References

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- 4) Bromham N, Dworzynski K, Eunson P, Fairhurst C. Cerebral palsy in adults: summary of NICE guidance. *BMJ.* 2019;364:l806.
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## Presenter biography

**Carlee Holmes** is the senior physiotherapist in the Young Adult Complex Disability Service (YACDS) at St. Vincent's Hospital Melbourne and also works in private neurological practice. The YACDS is a transition service from paediatric to adult healthcare for young adults with complex medico physical disabilities including cerebral palsy. Carlee has a particular interest in the measurement of postural asymmetry in non-ambulant adults with cerebral palsy and is currently completing a PhD investigating "Assessment and Management of the common postural characteristics in young adults with Cerebral palsy". She has also gained additional certification in Postural Care and Measurement of Body Symmetry.

Carlee is a research associate for CP Achieve and involved in the consumer working group. She is also a member of the American Academy for Cerebral Palsy and Developmental Medicine Lifespan Care Committee

## C14: Night- time positioning: Systematic approach to successful outcomes.

Joana Santiago  
Medifab, Sydney, Australia  
Clinical Education

### Learning objectives

Upon completion of this session, participants will be able to:

1. Identify three physiological side effects of immobility common in people with disabilities
2. Identify three potential issues that can be addressed by supported lying positions at night
3. Describe three potential benefits of promoting supported supine lying in clients with complex needs
4. List three potential risks factors that need to be addressed for successful and safe outcomes

### Abstract

People of all ages, who have a motor impairment or movement disorder, are at higher risk of developing postural deformities. Prolonged postures can be dangerous for any individual, however, for those who find it hard to change position, these may result in contractures and ultimately in structural deformities with life threatening consequences.

An intermediate level workshop analysing the negative effects that unsupported lying can have on clients with movement disorders. Evidence-based research suggests that preferred postures adopted in lying are greatly associated with postural deformities observed in sitting. Based on that, we will support clinicians with a systematic assessment process and will provide practical strategies for a successful intervention and implementation plan.

This is a great opportunity for everyone who wants to enhance their confidence and clinical reasoning skills in determining the optimal posture and functional requirements for their clients based on a 24-hour posture care management approach.

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### Presenter biography

**Joana Santiago** is the Clinical Educator Manager and the R&D Clinical Lead for

Medifab. She completed her degree in Occupational Therapy in Portugal and soon developed a passion for Posture Care and Wheelchair Seating & Positioning. With 15 years of experience, predominantly dealing with clients with complex postural needs, Joana takes pride in her flexible capability in reaching good clinical outcomes by considering the individual needs, wants and expectations of those she works with. Joana is based in Australia where she primarily assists clinicians by sharing her knowledge and expertise through education and mentoring programs. Furthermore, she has a positive influence on the development, supply, and training of Medifab's extensive range of products.

She is a specialist in her field and has presented at a variety of national and international conferences around the World.

## **D16: Permobil Platinum Plus Sponsor's Session:**

### **Introducing the New ROHO Hybrid Select**

Terri Davies,  
Product Manager – APAC, Permobil, New  
Zealand  
Rachel Maher  
Clinical Educator, Permobil, New Zealand

#### **Presenter Biography**

**Terri Davies** graduated from Brigham Young University in 2013 with a Bachelor of Science in Public Health having previously received her Associate of Science in Physical Therapy Assistant in 2010. Terri is currently completing her Master's in Applied Management.

Terri found her passion for Neuro while working in a non-profit Neuro clinic for three years and spent a year as a travelling therapist in the USA where she fell in love with wounds and realised her passion for pressure injury prevention.

Terri has worked for Permobil for 5 years in numerous roles including leading the New Zealand Rental Division as National Rental Services Manager and more recently National Business Development Manager. Terri started as Product Manager for APAC in January 2022.

**Rachel Maher** graduated from the University of Otago in 2003 with a Bachelor of Physiotherapy, and later gained her Post Graduate Diploma in Physiotherapy (Neurorehabilitation) in 2010.

After graduating, Rachel gained experience in inpatient rehabilitation and community Physiotherapy, before moving into a Child Development Service, working with children aged 0 to 16 years.

Rachel developed a passion for seating and mobility while working children, recognising the value of a team approach to wheelchair and seating provision to achieve the best outcomes for end users.

Rachel later moved into a Wheelchair and Seating Outreach Advisor role at Enable New Zealand in 2014, complementing her clinical knowledge with experience in NZ Ministry of Health funding processes.

Rachel joined Permobil in June 2020 and is passionate about education and working collaboratively to achieve the best result for our end users.

## E17: Listening to their voices: Children's and families' perspectives of power mobility use

Dr. Lisa K. Kenyon  
Grand Valley State University, Grand Rapids,  
USA  
Professor

### Learning objectives

At the completion of this educational session, attendees will be able to:

1. Discuss 3 ways in which children's perspectives of power mobility intervention could be incorporated into a pediatric power mobility intervention plan.
2. Discuss 3 ways in which parent's/caregivers' perspectives of power mobility use may evolve over time.
3. Compare and contrast 3 factors influencing procurement and use of power mobility devices.
4. Explain 3 ways in which these children's and families' perspectives can be applied to enhance our daily practice.

### Abstract

Power mobility use can have a life-changing impact on children and their families. The influence of power mobility use on children's play skills, psychosocial skills, and interpersonal/peer relationships is well documented in the literature. Children's use of power mobility also has been found to positively impact the attitudes of others towards children with disabilities, and in some cases, changes how other people view the abilities of children with mobility limitations. Despite these documented benefits, understanding children's and families' perspectives of power mobility use may provide additional insights into how these user groups see, judge, and perceive power mobility devices. This session will involve

listening to the voices of >75 children and parents/caregivers (20+ children and 55+ parents/caregivers) as they describe their experiences, concerns, joys, and sorrows related to children's power mobility use. Voices will include children who use a powered wheelchair and their parents/caregivers, children who use a powered wheelchair standing device and their parents/caregivers, and parents/caregivers of children who are exploratory or operational power mobility learners who are unable to speak for themselves. Through these voices, we will explore user perspectives and experiences on power mobility device use, power mobility intervention methods, factors influencing procurement of power mobility devices, and personal/environmental factors influencing everyday power mobility device use. These perspectives and experiences will be further examined within the context of existing research findings to consider interconnections amongst self, family, technology, and other people across time and place. Finally, we will reflect on how the perspectives of these children and families can be applied to enhance our daily practice.

### Content references:

- 1) Livingstone R, Field D. Systematic review of power mobility outcomes for infants, children and adolescents with mobility limitations. *Clin Rehabil.* 2014; 28: 954–64.
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pediatric physical therapist practice and has published multiple peer-reviewed journal articles and book chapters pertaining to power mobility and pediatric topics. Dr. Kenyon currently serves on the Editorial Committee for the Wheelchair Skills Program (Dalhousie University, Halifax, Nova Scotia, Canada) and on the Pediatric Specialty Council of the American Board of Physical Therapy Specialties.

### **Presenter biography**

**Lisa Kenyon** is a Professor in the Department of Physical Therapy at Grand Valley State University in Grand Rapids, Michigan. Dr. Kenyon heads the Grand Valley Power Mobility Project, an inter-professional research and service project that provides power mobility training for infants, toddlers, children and young adults who are not typically considered to be candidates for power mobility use. Dr. Kenyon presents nationally and internationally on topics related to

## E18: Considerations for Determining Optimal Manual Wheelchair Configuration – what are the “non-negotiables”?

[Deb Wilson](#)<sup>1</sup>, [Sandie Grant](#)<sup>2</sup>

<sup>1</sup>Geneva Healthcare -Seating To Go, Hamilton, New Zealand. <sup>2</sup>Geneva Healthcare - Seating To Go, Tauranga, New Zealand

Deb Wilson, Training Lead  
Sandie Grant, Senior Wheelchair & Seating Therapist

### Beginner - Intermediate

### Learning objectives

Upon completion of this session, participants will be able to:

1. Describe 3 key considerations when configuring a manual wheelchair for an active user
2. Describe 3 adjustments on manual wheelchairs that impact propulsion, transfers and functional stability.
3. Identify 3 “non – negotiable” factors that will become the starting point for scripting a wheelchair for an individual

### Abstract

Manual wheelchair design continues to improve as we understand more about the impact of configuration on propulsion efficiency, posture and stability, injury prevention, activity and function. The diverse community of people living with disabilities, and the essence of what an everyday life means for them in their communities, adds to the unique prescription considerations when assessing for a manual wheelchair. There is no formula, and for those who are beginning their journey into the wheeled mobility and seating community, the adjustable capabilities and options available on configurable manual wheelchairs can be overwhelming.

This session will start by introducing key concepts such as centre of gravity, rolling resistance and, rotational inertia that will impact propulsion efficiency and upper limb/shoulder preservation. We will discuss “non-negotiable” factors e.g. transfer technique, decreased ROM, that will inform the starting point from which individual wheelchair configuration will evolve.

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### Presenter biography

**Deb Wilson** is an Occupational Therapist with over 30 years clinical experience. She is the Training Lead of Seating To Go, part of the Geneva Healthcare Group and a leading

wheelchair and seating assessment, training and repair service in New Zealand.

In 2009, she helped develop the NZ Ministry of Health wheeled mobility and postural management credential for occupational therapists and physiotherapists. She is the NZ Chair for OSS and has contributed to capacity building in the Pacific Islands with Motivation Australia. Deb is currently a member of the ISWP Wheelchair Educators Package Development Group.

**Sandie Grant** is a Senior Wheelchair & Seating Therapist and training facilitator at Seating To Go, part of the Geneva Healthcare Group, New Zealand. Sandie started working for STG in 2000 and has developed a passion for sharing her knowledge and experience of wheelchair and seating within the organisation and as part of the training team. Sandie started her Occupational Therapy career as a new graduate working in USA in 1992. With a solid grounding working in a large rehabilitation hospital, she then went on to work in a hand clinic, neonatal unit and finally moving back to NZ where she worked as a community OT before joining the STG team 2000. Sandie takes pride in her flexible capability in reaching good clinical outcomes and is passionate about education and working collaboratively to achieve the best result for our end users.

In her spare time she enjoys spending time with her husband and three kids camping, tramping and adventure racing

