



The Clinician Scientist in the Seating and Mobility Clinic: A foundation for Education, Research, and Clinical Practice

International Seating Symposium
Vancouver, British Columbia
March 4, 2016



Presenters

- **Theresa F. Berner, MOT,OTR/L, ATP**
 - Rehab Manger and Clinical Instructor
 - Assistive Technology Center - The Ohio State University Wexner Medical Center
 - Occupational Therapy Division - The Ohio State University
- **Bonnie Sawatzky, PhD**
 - Associate Professor, Department of Orthopaedics
 - University of British Columbia
- **Carmen P. DiGiovine, PhD ATP/SMS RET**
 - Clinical Assistant Professor and Program Director
 - Assistive Technology Center - The Ohio State University Wexner Medical Center
 - Occupational Therapy Division - The Ohio State University
 - Biomedical Engineering Department - The Ohio State University
- **Tina Roesler, PT, MS, ABDA**
 - Director, International Sales and Education, Motion Composites



Objectives

- List the three core components of the clinician scientist
- Describe examples of the clinician scientist role in a seating and mobility clinic
- Identify one way you can advance your skills as a clinician scientist
- Identify one way you can advance the seating and mobility clinic you work in to improve service delivery process



The Clinician Scientist

- “Clinician-scientists are the essential conduit between laboratory and clinic”
- “ ...clinician-scientists are rare and endangered...”
- Clinician scientist programs established in the UK in the mid 80’s with similar aim to the NIH funding stream



The Clinician Scientist

- Focus was to allow clinicians to develop post-doctorate research programs under the wings of established investigators while engaged in clinical practice
- Model showed success with research funding and continuation of full professorships
- U.S. training pathways are well designed to accommodate Phd's and MD's



Canadian Clinician Scientists

- Clinician Scientists are medical doctors who have undertaken additional training in health research or basic science
- They have an opportunity to undertake key aspects of the scientific research process within the clinical setting.
- The unique position and research mandate permits them to adopt a more complex study and develop a more thorough understanding of the disease.



The Role of Researchers in Clinical Practice



Clinician Alone



Researcher Alone



Together



Clinician's Research



“Trust me, I checked it out, it is easier to push a pneumatic tire than a solid one.”



Researcher's Research

"Where's the evidence?"

"is it statistically significant?"

Given an n of 17 and with a p value of 0.27



Researcher's Research

On Tuesdays when there is an "R" in the month.....



Researcher's Research

When the participant had only oatmeal for breakfast.....



Researcher's Research

three hours prior to testing.....



Researcher's Research

- on days when the barometric pressure was < 29.92 kP of mercury.....



Researcher's Research

plus or minus .03.....



Researcher's Research

There is a statistically significant difference between the distance rolled by a round wheel compared to a square one.....



Researcher's Research

More research is needed before we can confirm however, that a round wheel is better than any other shape.



Clinician's Contributions



■ Context

- Clinical Expertise
- Awareness of limitations
- Accessing subjects
- Presenting results to peers and consumers
- Insight into validity of question
- Knowledge of current practices
- Network of peers



Researcher's Contributions

- Knowledge of process
 - Refining question so answer is relevant
 - Understanding of ethics process
 - Access to grant money
 - Application of appropriate methodology
 - Understanding of terminology
 - Comprehensive Literature Reviews
 - Analyzing data
 - Writing papers
 - Understanding publishing pitfalls



Climate of today's Clinicians

- Doctorate of Physical Therapy Programs
 - Clinical Practicums
- APTA Physical Therapy Residency Programs
- APTA Physical Therapy Fellowship Programs

- Doctorate of Occupational Therapy Programs
 - Clinical Capstone Practicums
- AOTA Occupational Therapy Residency Programs



Current trends

- Evidence Based Medicine
- More focus on specializations
- Direct access models
- Fee for Service Programs
- AOTA initiative for non-traditional placements
- US Accountable Care Act



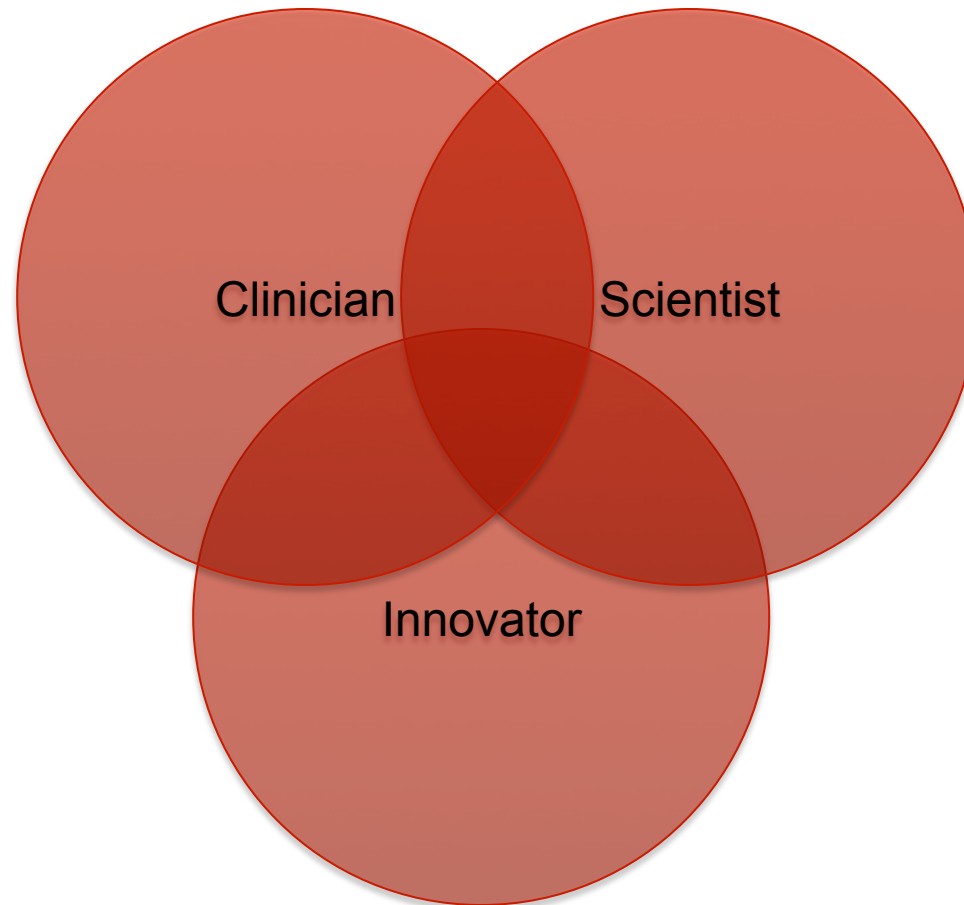
Collaborate Outside of Therapy Roles

- RESNA Student Design Competition



ION
SITES

Clinician-Scientist-Innovator



Case for clinician – researcher

Spasticity reduction using the Segway for people with SCI

Bonita Sawatzky, Phd, (Researcher)

Grace Boutilier, MSc, (Graduate student)

Heather Finlayson, MD (Physiatrist – clinician)

Ian Denison, PT (Physiotherapist – clinician)

University of British Columbia, Vancouver, Canada





Researcher – Clinician relationship

- Established relationship
 - Vibration effects on spasticity
 - Segway as a useful mobility device for PWD
- Clinician suggested linking the two since non pharmacological treatments for spasticity are challenging.
- Could not do the study without clinician / researcher relationship

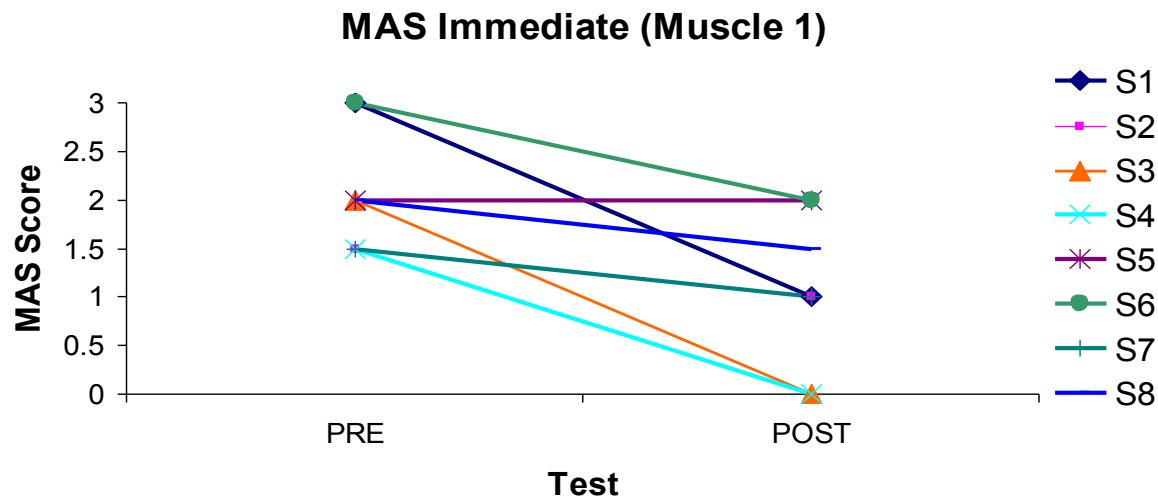
Impact on spasticity

- Objectives:
 - Is there an immediate intervention effect of the Segway on reduction of spasticity as measured by the Modified Ashworth Scale?
 - Is there an intervention effect of the Segway on reduction of spasticity, pain and fatigue as measured by MAS and self-report tools over time
- Protocol:
 - 30 min/day, 3x/week x one month
 - Assessments at baseline, 2 weeks, one month



Results

- 9 subjects with SCI, 1 withdrew
- Significant reduction in MAS scores immediately post-Segway use



No significant change in MAS over time or other outcomes



Why might spasticity change?



Spasticity vs Standing

- 10 SCI; 10 AB participants
- Study muscle activity changes before and after
 - Segway use (Indoor circuit)
 - Stationary segway

Bonita Sawatzky, PhD (Researcher)

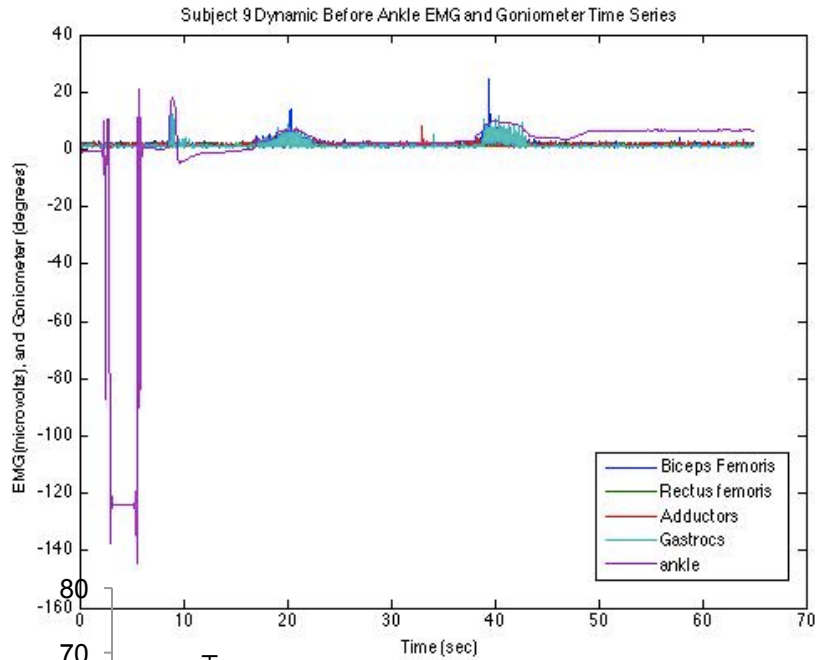
Mahsa Sadeghi, MD, MSc (graduate student/clinician)

Heather Finlayson, MD (clinician)

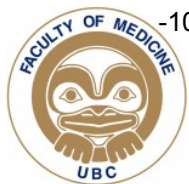
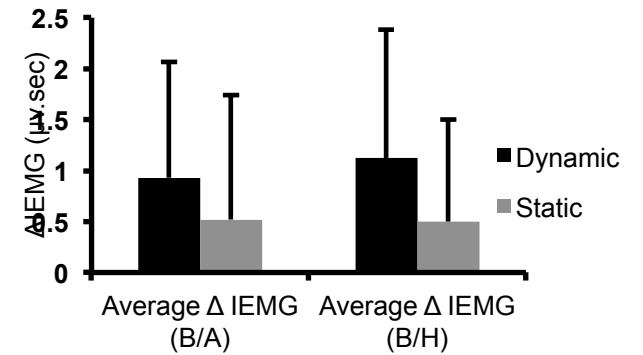
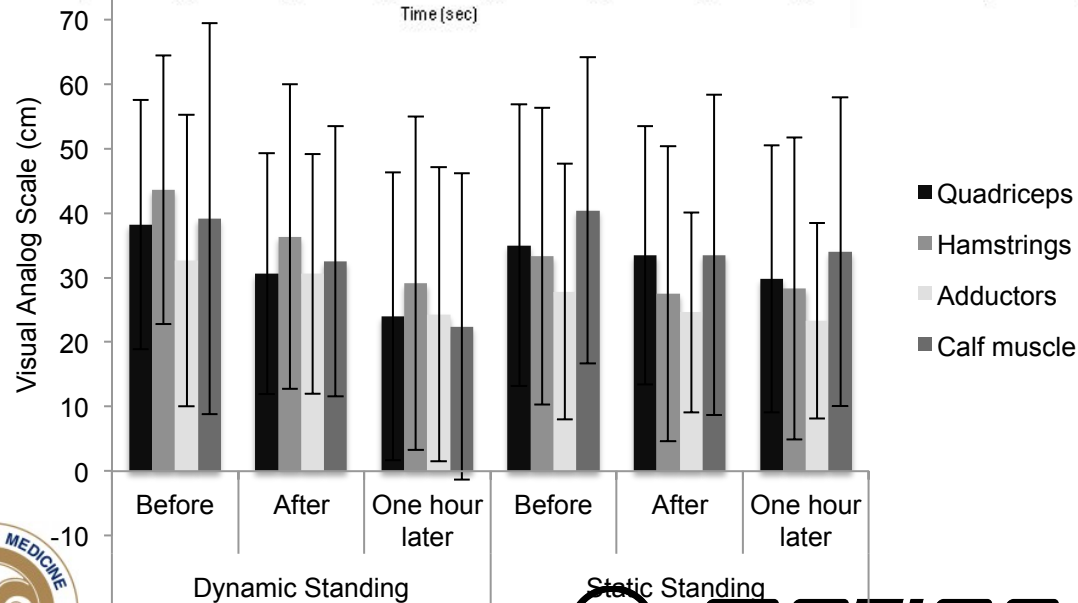
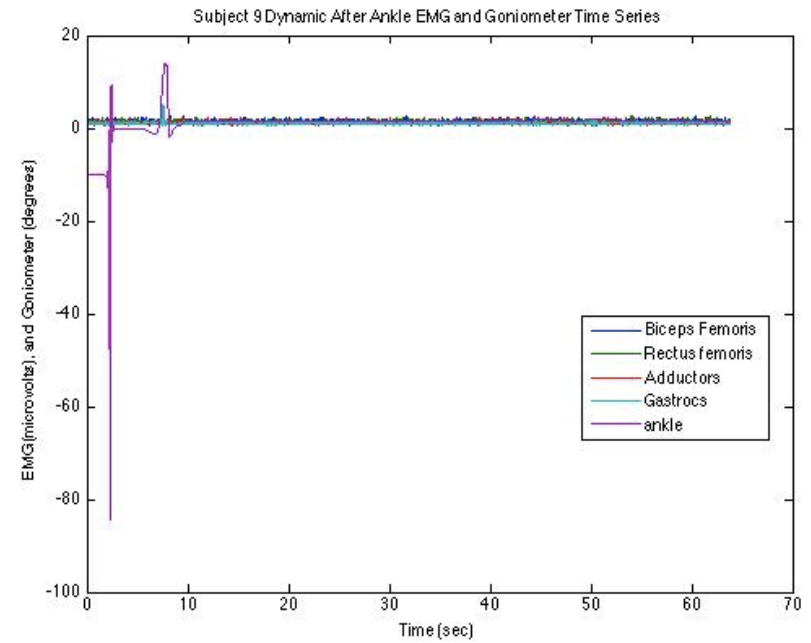
Jake McIvor, MEng (Engineer/Researcher)



Before Ankle:



After Ankle:



Standing options?

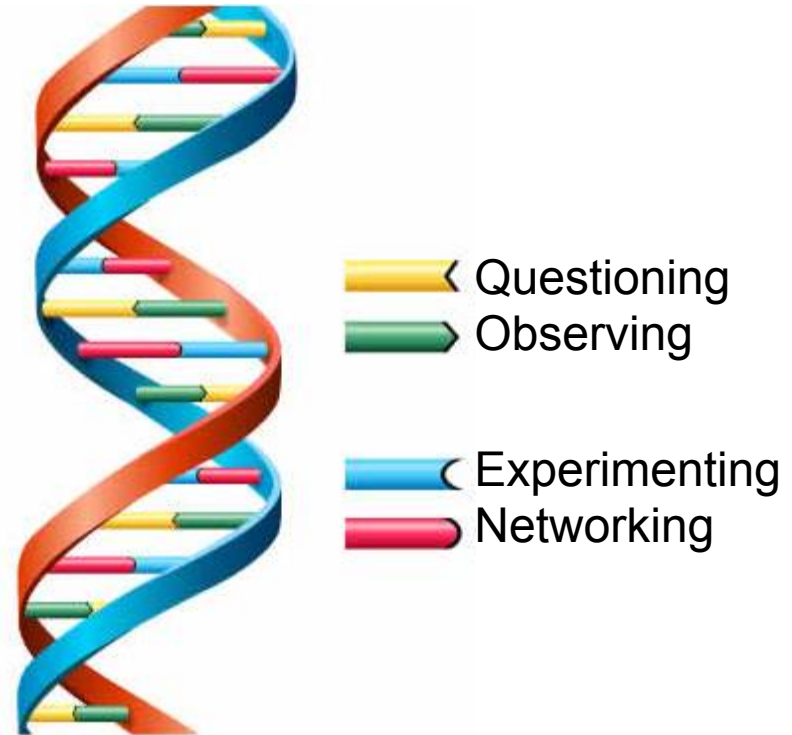


Innovation!!



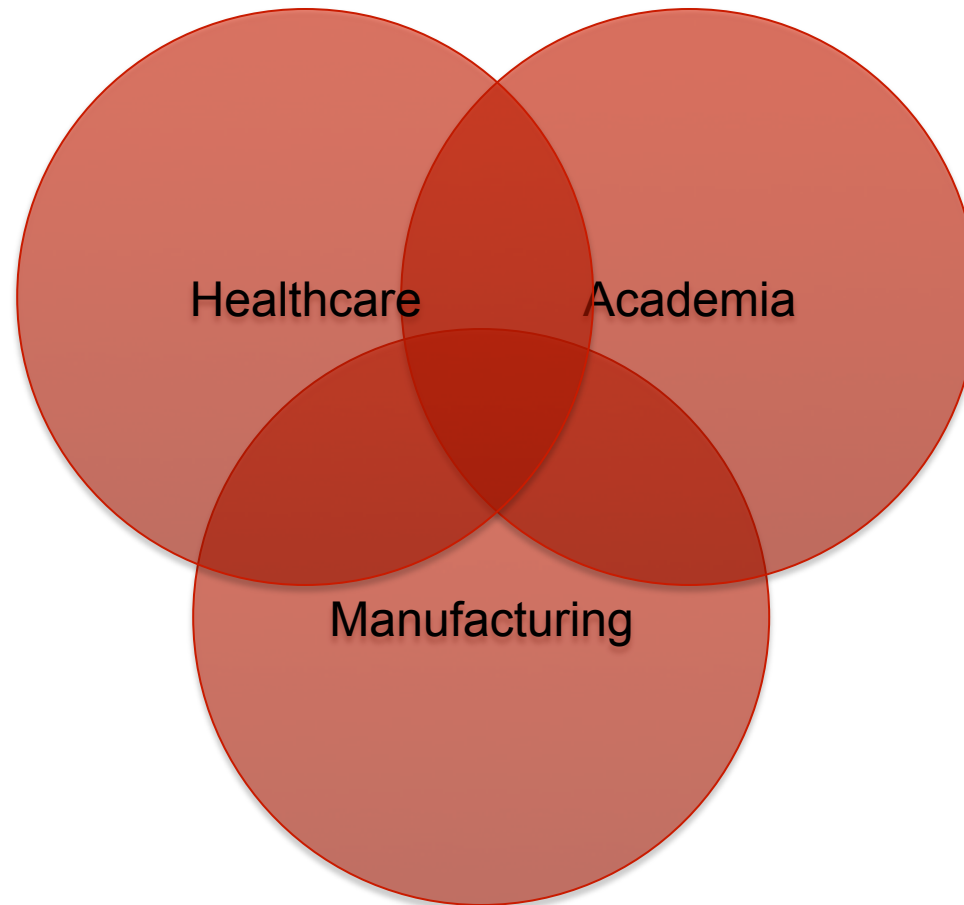
Innovation

- Discovery Skills
 - Associating
 - Questioning
 - Observing
 - Experimenting
 - Networking



Dyer, Gregersen & Christensen (2009)

Innovation



Does the Manufacturer Have a Roll?

- Support and facilitate clinical research
 - Direct and indirect funding of projects
 - Sponsorship of CS at conferences and forums
 - Donation of equipment/product for clinical research
- Support product development
 - Sponsor or work with students to design
 - Work with researchers to bring research tools to market
 - Design product based on research results
 - Lic. Products developed by CS
- Directly employ CS to facilitate evidence based practice and product development
- Support entrepreneurialism

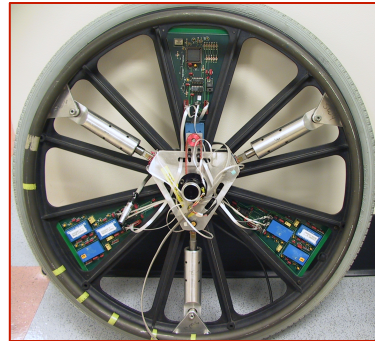
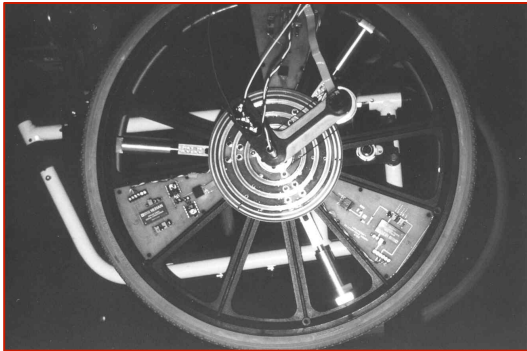


The ROHO Institute

- Most comprehensive platform in our industry
- Maintains a Scientific Advisory Board
 - Internationally renowned group of researchers and clinicians
- Provides accredited CEU programming in a variety of fields
- Actively involved in various domestic and International organizations
 - EPUAP, RESNA, ATSA, WOCN,
 - ISO committee involvement
- Clinical staff maintain various licensure and accreditations in their field
- Support variety or research initiatives



Smartwheel: Research Tool to Clinical Assessment



Evidence Based Product Development

- Flexrim and Natural Fit handrims
- Peer reviewed studies utilized to:
 - Identify a clinical problem
 - Prove efficacy of design features
 - Indicate real clinical benefits
- Aids with funding/justification in uncertain funding climate



The CS as a Manufacturer's Employee

- Cooperative and collaborative projects
 - Support student design
 - Instigate clinical trials/studies
- Dissemination of clinically relevant research material
 - Presentations at international conferences
 - Collaboration with practicing CS
 - Website development that links to important resources for the clinician
- Direct Impact on Manufacturing
 - Leads product development and engineering teams
 - Provides evidence based accredited clinical education



Examples of the CS in Industry

- Motion Composites - collaborative presentations and work to develop EBP and push product innovation
- Body Point – Actively involved in ISO testing development for wheelchair accessories and positioning devices
- Permobil Group
 - The ROHO Institute
 - VP of Global Product Management =CS
 - OutFront
- Max Mobility
 - Owned/operated by CS
 - Brings research based products to market



Case Study 2

- Engineering Capstone Clinical Projects
 - Mechanical Engineering (bachelor degree)
 - Biomedical Engineering (bachelor degree)
 - Occupational Therapy (masters degree)
 - Physical Therapy (Doctorate degree)
 - Engineering Mentor (Academic)
 - Clinical Mentor (Medical Center)
 - Community Organization



Rehabilitation Engineering Senior Capstone

- Present clinical scenario and spend 9 months solving the problem
- Identify the problem, outline the solution, build prototypes, test prototypes, rebuild
- Explore patents and commercialization
- Opportunities for professional presentations and/or posters
- RESNA and/or other student design contents

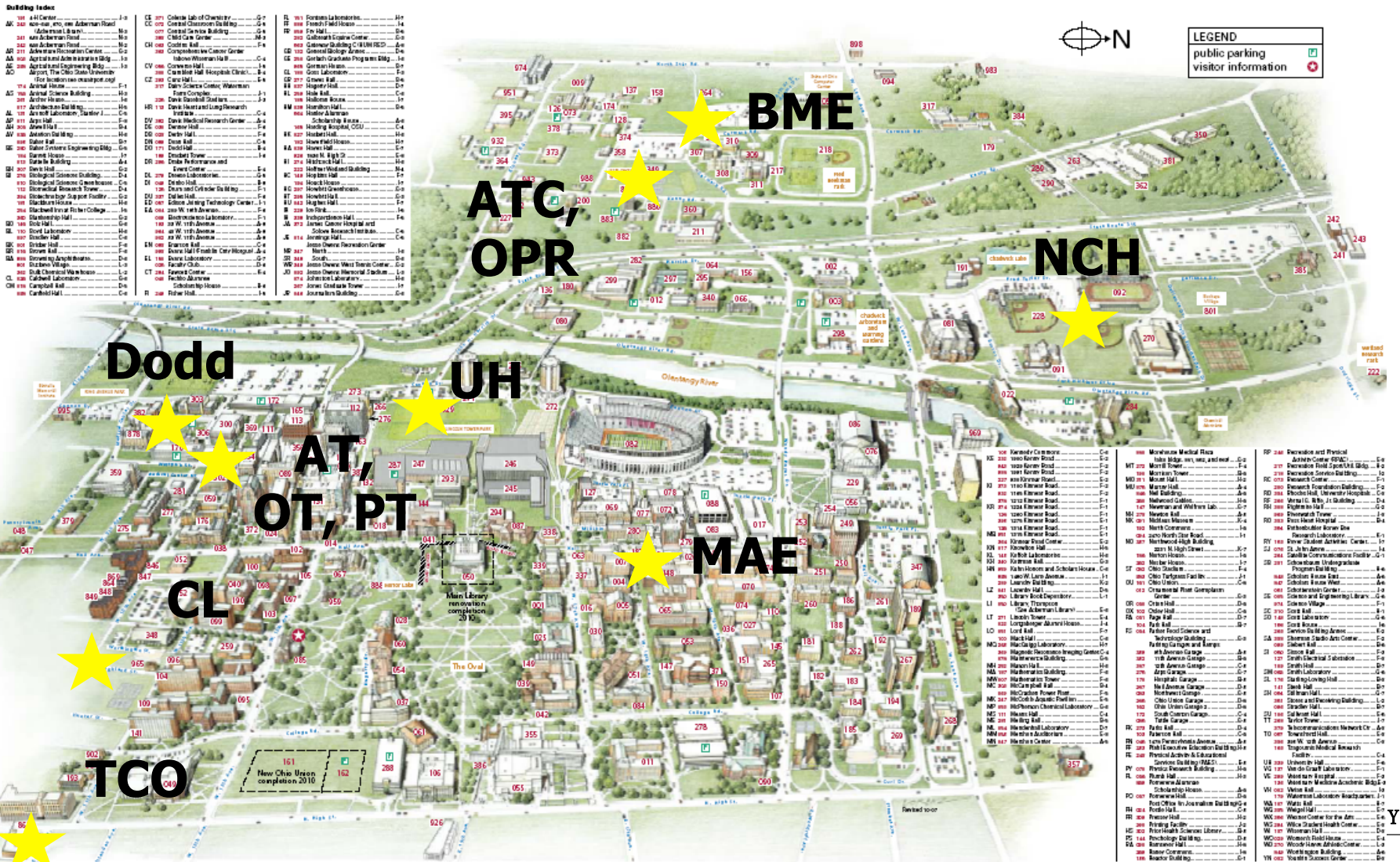


Rehabilitation Engineering Collaborations

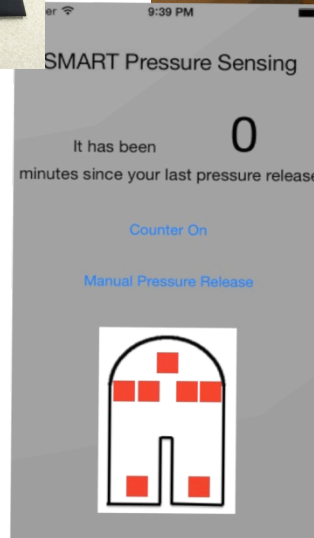
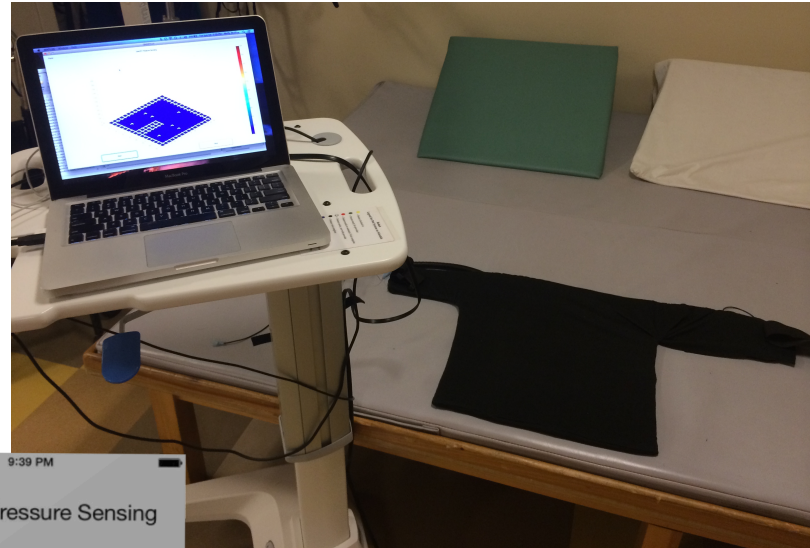
- Creative Living
- Nationwide Children's Hospital
- School of Health and Rehabilitation Sciences
 - Athletic Training
 - Occupational Therapy
 - Physical Therapy
- School of Engineering
 - Biomedical Engineering
 - Mechanical and Aerospace Engineering
- The Ohio State University Wexner Medical Center
 - Assistive Technology Center
 - Outpatient Rehabilitation
 - Dodd Inpatient Rehabilitation
 - University Hospital



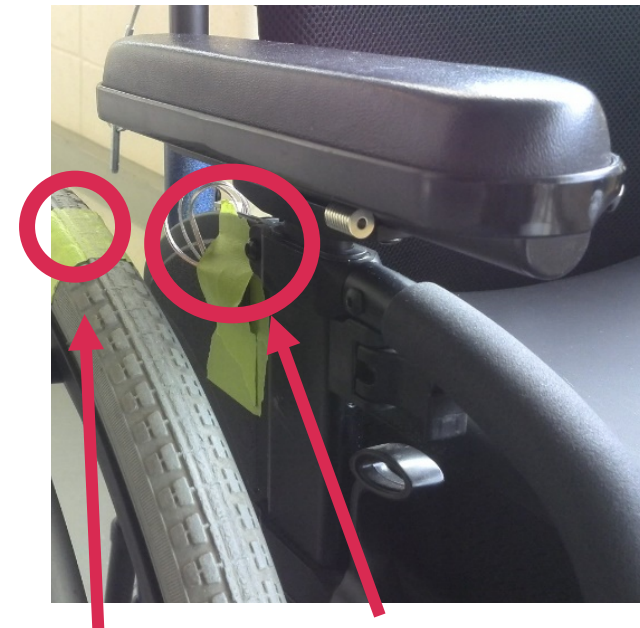
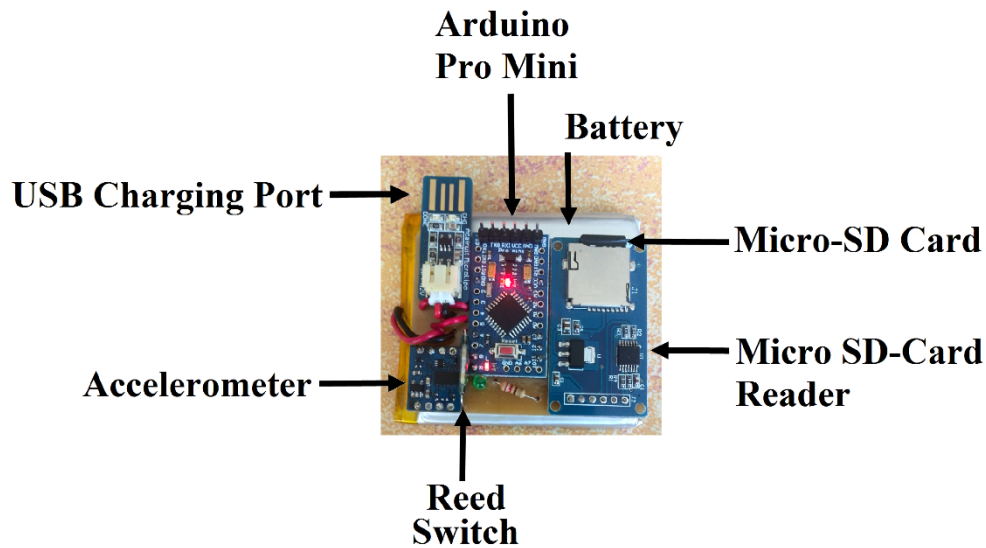
Rehabilitation Engineering Collaborations



SitSmart - Pressure Sensors for Pressure Ulcer Prevention



SmartHub - Activity Measurement System for Manual Wheelchair Propulsion



Magnet
Data Collection Box



Case Study 2: Industry Sponsored Grants

- IRB approved clinical research following institution guidelines
- Release of clinician time (often 5 – 10 %)
- Consumer, Clinician and Research input
- Practical Studies that occur at the clinic
- Exposes clinicians to research
- Allows Research to gain access to the clinic



Case Study 3: Clinical Outcomes Research

- True collaboration between the clinic and the lab
- Academic Medical Center
- Unites the academic and clinical worlds
- 75% research and 25% clinical
- 25% research and 75% clinical
- Also brings collaboration and communication between both full time clinicians and researchers



Case Study 3: Clinical Outcome Research Center

- Define CORC
- Expectations
 - Meetings: Monthly with mentors and Quarterly with team
 - Annual Metric for Merit review
 - 1st author abstract submitted and accepted to National Conference for Poster
 - Contribution in overall productivity and collegial education within SHPI research
 - Dissemination/translation of information to clinicians both informally (during clinic hours) and formally (via clinical practice Presentations to staff and teams)



Sports Health & Performance Institute (SHPI)

- Trans-disciplinary collaboration.
- Sports Medicine has faculty in Orthopaedics, Family Medicine, Internal Medicine and Physical Therapy.
- Research involves the College of Medicine, College of Veterinary Medicine, School of Health & Rehabilitation Sciences, Biomedical Informatics, Division of Cardiovascular Medicine and Division of Pulmonary, Allergy, Critical Care and Sleep Medicine.
- SHPI faculty are involved in numerous multi-center studies, grants, national and international presentations and ongoing publications.



Case Study 5: Adapted Sports Institute

Our Mission:

- Support individuals with disabilities in developing and maintaining a healthy lifestyle
- Strive to unite and support organizations that provide opportunities for individuals to develop independence, confidence and fitness
- Integrate evidence based and innovative treatment strategies for injury prevention and performance in adapted sports



Adapted Sports Institute

How We Can Help:

- Personalized evidence-based interventions for a variety of injuries
- Injury prevention
- Equipment evaluation and training
- Diagnostic Programming:
 - Propulsion evaluation and training using the smart wheel
 - Skin protection and assessment using pressure mapping
 - Equipment assessment
- Referral network of specialists in Physical Medicine and Rehabilitation and Orthopedics



Adapted Sports Institute

- Received first IRB to look at shoulder pain with Quad Rugby Players
- Held first Continuing Education Conference in collaboration with local Adaptive Sports Group
- Referrals getting identified for intervention
- Integrate DPT Practicum Students for assistance of Clinical Practice Guideline for Shoulder Preservation and Return to Sport



Start Simple

- Start/Participate in Journal Clubs
 - Virtual or onsite
- Integrate Grand Rounds
- Set aside time for clinical skills training
- Attend events with researchers to engage and explore potential relationships
- Develop work groups for clinical practice programming
- Reach out to academic programs for collaboration with capstones, practicums, and/or residencies



Thank you!!!

- Corresponding Author

- Theresa F. Berner, MOT, OTR/L, ATP
Theresa.berner@osumc.edu

