

ME 4905

Engineering Design for Rehabilitation & Assistive Technology

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T · H · E
OHIO
STATE
UNIVERSITY DEPARTMENT OF
**BIOMEDICAL
ENGINEERING**



ME 4905

Course Structure

Students:

- 25 - 30 ME students
- 25-30 BME students
- 5 -10 Occupational therapy and Physical therapy students

Mentors/team advisors:

- Engineering mentor from ME or BME
- Clinical mentor from Occupational therapy, Physical therapy, Sports Medicine, Surgery



ME 4905

Course sequence: Fully integrated BME, ME, OT/PT teams

Fall:

- First seven weeks in a specific section of ME 4900 for Medical Device Students:

MECHENG 4900 LEC: Monday_4:10-5:30PM (W180)

LAB: Wednesday/Friday_3:55-5:45PM (W180)

- Second seven weeks:

ME 4905.01 ‘Capstone Design II – Assistive Devices’

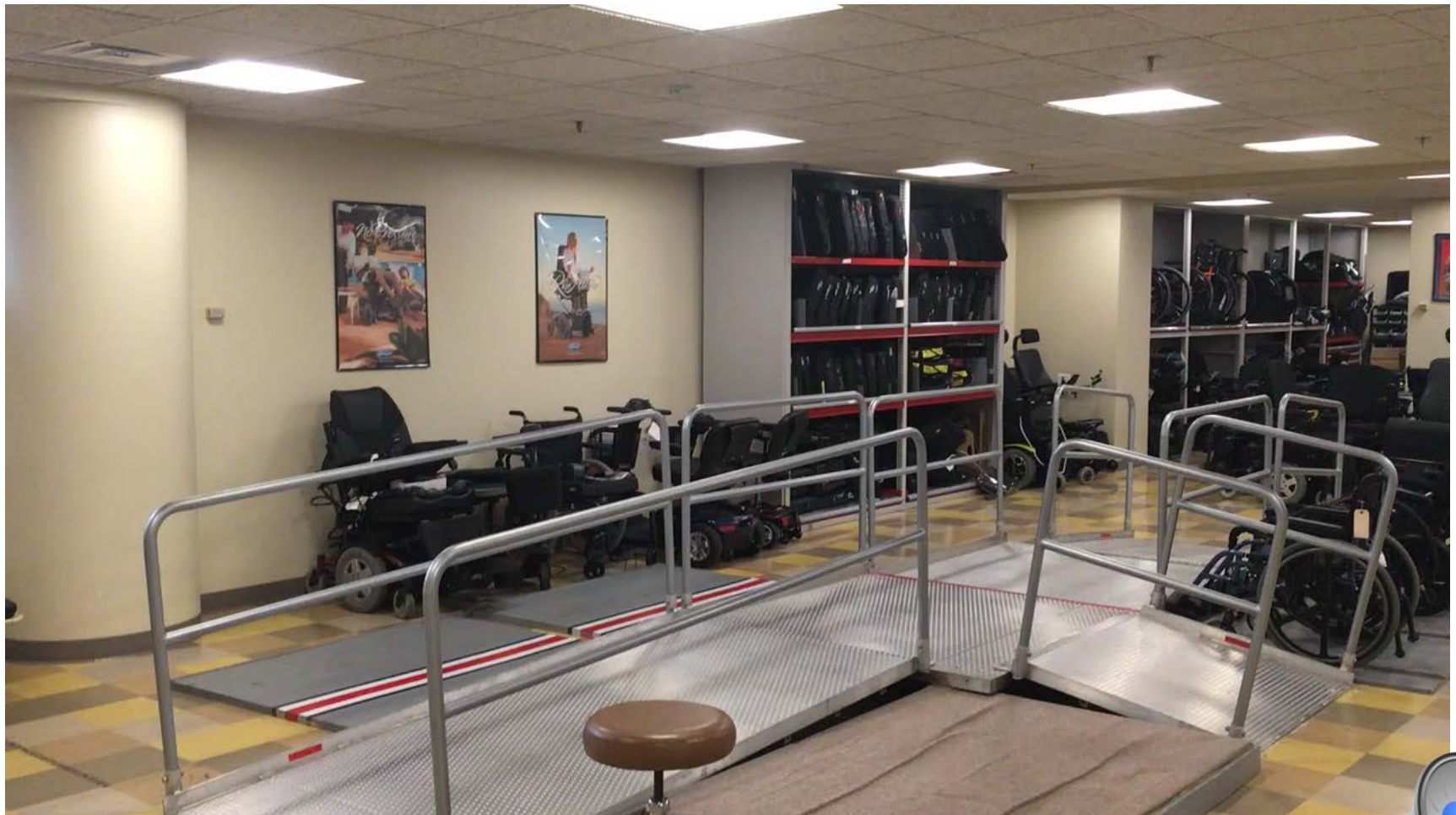
Spring

- ME 4905.02 – ‘Capstone Design III – Assistive Devices’



Where we work

The Assistive Technology (AT) Center



The Assistive Technology (AT) Center



Recent Projects

Patient sling lift

Transfers to and from a wheelchair are often performed with the assistance of a patient lift.

Many of these devices place the patient in a position that is uncomfortable and can be insecure.

This team redesigned the lift to be so secure that it could be used to for transfers into and out of a bathtub, in a more upright, sitting posture.



Design of a more secure, comfortable & supportive sling for patient transfer device.



Recent Projects

Pediatric tricycle for children with achondroplasia

- Achondroplasia is a genetic condition that results in short stature, as well as shorter arm and leg lengths
- Children with achondroplasia are often unable to ride normal tricycles due to their unique anthropometry.
- This group designed a tricycle with geometry that is suitable for the unique anthropometry of children with achondroplasia.



Recent Projects

Off-road wheelchair device

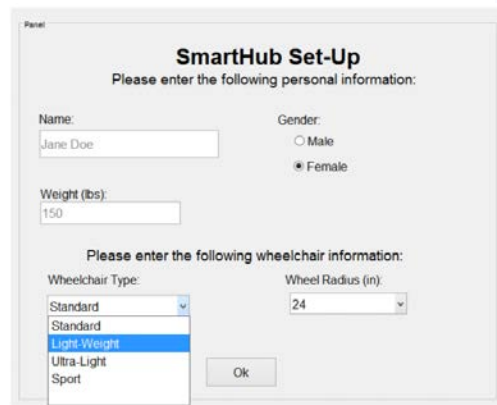
This group developed a reasonably priced device that can be attached to a manual wheelchair and allow a caregiver to navigate rough, hilly, or uneven terrain, allowing access to a wider range of environments and activities



Recent Projects

SmartHub

- Manual wheelchair users often experience pain and overexertion injuries to their shoulder from the repetitive motion associated with self propulsion.
- This group developed an exercise & fitness tracking device, much like a FitBit for wheelchair users.



SmartHub Set-Up
Please enter the following personal information:

Name: Gender: Male Female

Weight (lbs):

Please enter the following wheelchair information:

Wheelchair Type: Wheel Radius (in):

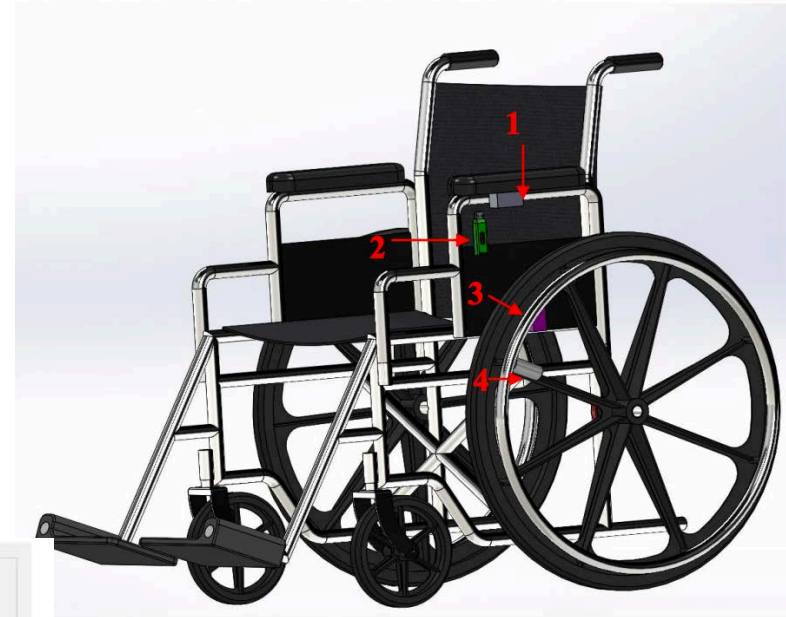


Figure 13: Proposed Device on Wheelchair

Table 13: Description of Figure 13

1	Control Box
2	USB Key
3	Reed Switch + Accelerometer Box
4	Magnet

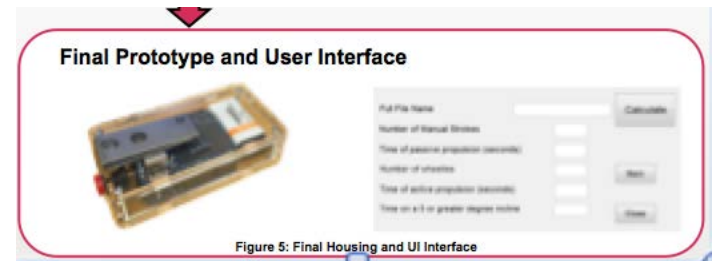
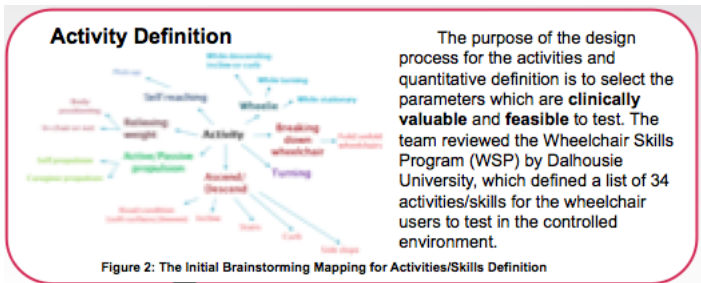


Recent Projects

Wheelchair monitoring system

Device to allow clinical physical therapists to better assist their manual wheelchair users.

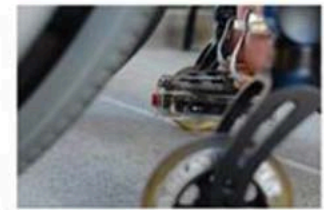
The device collects data about the wheelchair user's daily activity that can be adjusted in a way to give the clinicians valuable information that they can use to teach and make adjustments to their patients' use wheelchairs.



Community Environment Test



Learning



Mounting



Ascending/Descending



Wheelie



ME 4905

Unique features & benefits

- Each group has an engineering advisor and a clinical/medical advisor.
- Opportunity to work in a medical environment on current real-world problems.
- Products are tested in the clinic with medical professionals and patients.
- Many of the designs are incorporated into the clinical setting during or after the course.
- Make a difference while learning the process of design!



Questions?

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