**What is Cerebral Palsy?**
- Group of permanent neurological disorders that affect the developing fetal or infant brain
- Neurological disorder affects movement and posture of the child, preventing full coordination and motor development of the muscles
- Activity limitations due to:
  - Body weakness
  - Muscle spasticity
  - Rigidity of muscles
  - Poor coordination of muscles

**Children with Cerebral Palsy**
- Cerebral Palsy is a common motor impairment in children
- 3.3 out of 1,000 children are diagnosed with having Cerebral Palsy¹

**Treatments available**
- Physical Therapy
- Orthotics
- Medications (e.g., Baclofen or injection of botulinum toxin)
- Rhizotomy or orthopedic surgery
- Spinal bracing

**Physical Therapy Assessments**
- Melbourne Assessment of Unilateral Upper Limb Function
- Quality of Upper Extremity Test
- Upper Extremity Fugl-Meyer Assessment (UEFMA)

**Electrical Stimulation**
- Progress seen immediately
- Low amplitude also promises improvement

**Haptic Master Robotic System²**
- Virtual reality system with game simulation
- Improves active supination range of motion

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**Introduction**

**Materials & Methods**

**Results**

**Conclusions**

**Future Work**

**Acknowledgements**

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**Purpose**

To design an arm rehabilitation device that will:
- Improve the child’s arm movement control
- Improve range of motion
- Reduce spasticity

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**Evaluation Criteria**
- Number of parts
- Location and weight of motors
- Expanded degrees of freedom / active range of motion
- Overall weight

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**The first design proved too cumbersome and not portable**
- The current design uses motors, bands, and cuff attachments to mimic muscle structure of natural arm in four degrees of freedom
- Current design is wearable and portable

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**Modification of design in terms of material selection and dimensional optimization**
- Design sleeve for electrical stimulation
- Prototype the design
- Evaluate prototype for improvements at outpatient clinics utilizing patient surveys

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- UNL McNair Scholars Program