

# Student Summer Scholar Program Application Examples

## A1. Project Goals and Scope

### Example 2

**This application reflects a continuation of an on-going NIH-funded clinical trial and builds upon work completed during the 2022 Student Summer Scholar Program.**

**1a. Background:** Cerebral palsy, the most common physical disability in childhood, is a lifelong condition primarily affecting an individual's ability to move and function.<sup>1</sup> In the United States alone, approximately 10,000 children a year are born with cerebral palsy, 30% of whom will go on to have limited or no ability to walk.<sup>1,2</sup> Independent mobility is a critical component of a child's cognitive, physical, and social well-being.<sup>3-6</sup> For children with severe cerebral palsy, independent mobility is often impossible without a powered wheelchair.<sup>7</sup> The independent mobility provided by a powered wheelchair has been shown to enhance child's self-confidence and self-esteem, and increase their independence within activities of daily life.<sup>8</sup> Unfortunately, the skills needed to operate a powered wheelchair are difficult for children to master and the current approach to training powered wheelchair skills is both time and labor intensive.<sup>9</sup> As such, many children with severe cerebral palsy are excluded from powered wheelchair training.<sup>7</sup> This exclusion effectively denies these children the opportunity to achieve the functional independence afforded by a power wheelchair, making them entirely dependent on others to move or carry them.

Our funded National Institutes of Health Small Business Innovations (SBIR) grant (NIH R44HD103522) seeks to address this problem through a new videogame-based wheelchair training system that we call the IndieTrainer. The IndieTrainer temporarily converts a child's manual wheelchair or adapted stroller into a powered wheelchair, thereby allowing them to safely practice powered wheelchair skills in their existing manual wheelchair. Using the IndieTrainer allows children to practice and master power wheelchair skills through 8 different training stages. These 8 training stages progress from basic power wheelchair skills at Stage 1 (starting and stopping the power wheelchair) to complex power wheelchair skills at Stage 8 (going up a ramp, through doors, navigating crowds, etc.). Safe performance of these complex skills is required for a child to qualify for insurance reimbursement of their own individually prescribed powered wheelchair.<sup>9-11</sup>

Our hypothesis is that the IndieTrainer facilitates more accessible and effective power mobility training, thereby allowing more children to improve their power wheelchair skills and increase their chances to qualify for their own individually prescribed powered wheelchair. As part of this SBIR, we are conducting a single-arm (i.e., one group) clinical trial involving 25 children with cerebral palsy to evaluate use of the IndieTrainer. This Student Summer Scholars project involves assisting Dr. [REDACTED], a licensed physical therapist, in this clinical trial.

**1b. Big Picture:** Currently, power wheelchair training is typically only provided to children who have shown an aptitude to learn quickly and thus will require less time and resources to demonstrate the skills necessary to qualify for their own individually prescribed powered wheelchair.<sup>12</sup> Yet, multiple research studies have shown individuals with more severe impairment are capable of independently using a powered wheelchair, if given enough training time to learn.<sup>13,14</sup> In addition, even for children who may not achieve independent power wheelchair use,

power mobility training is a therapeutic activity that facilitates learning through increased play, exposure to problem solving, and exploration opportunities.<sup>15</sup> By expanding access to power mobility training, we believe the IndieTrainer will allow more children the opportunity to benefit from the functional independence afforded by a power wheelchair. The knowledge gained from this study will provide life-changing opportunities to children with cerebral palsy throughout the United States and around the world.