IMPROVING THE TRANSMISSION OF A 12 FOOT DANCE VEHICLE

Overview
A Penn State Creative Campus collaborative project called the “Secret Life of Public Spaces” (SLoPS) prompted the creative idea of a mobile dance vehicle. This vehicle would be used as a prop in a modern dance performance, focusing on the visual ideas of movement and play and choreographed by Diavolo, a Los Angeles based dance center. The architecture design team needed an improved transmission system for this vehicle, which was discovered after they built an initial prototype that didn’t function entirely as intended.

Objectives
- Redesign an interface between the inner cage and outer drive wheels
- Support the weight of the vehicle without deforming while reducing friction and noise
- Maintain the vision of the vehicle and incorporate similar aesthetic elements

Approach
- Meet weekly with designers, architects, and dancers in the IdeaLab incubator space to learn their needs for the vehicle along with the aesthetic elements that must be incorporated
- Model the new design for the vehicle in a computer aided design (CAD) software
- Perform patent search for any rolling mechanisms related to roller coaster wheel designs
- Narrow down designs using concept selection matrices and sponsor input
- Model transmission in CAD software and perform finite element analysis (FEA) on components
- Build an alpha prototype, then physically test to confirm FEA results
- Assemble transmissions and entire vehicle with the help of the architecture team

Outcomes
- The team was awarded 2nd place at the project showcase for “best design”
- The finished product received positive feedback from the sponsor and artistic critics
- The dance team performed in front of over 1,000 people on the Penn State campus
- All customer needs were exceedingly met
- The team learned the value of collaboration and interdisciplinary projects