Overview
Discovery Space of Central Pennsylvania is a science museum designed to provide children with fun, interactive exhibits. Due to a recent location change, Discovery Space has found a need to obtain an additional exhibit for outdoor use. The company has requested the creation of a large percussion instrument display to attract visitors and provide entertainment for guests outside of the facility.

Objectives
The objective of this project is to design an outdoor percussion display that allows guests of all ages to gain an appreciation of Discovery Space’s services before entering the facility. The display is to feature tuned percussion instruments and allow for simultaneous users.

Approach
- A site visit was made to Discovery Space’s facility in State College, PA.
- Customer needs were established by way of direct discussion with Discovery Space employees as well as observation of current exhibits.
- Customer needs were analysed in order to determine the prioritization of safety, weather resistance, durability and sound quality.
- Relevant patents and pre-existing products were researched in order to begin concept generation.
- Final concepts were chosen based on how well each customer need was satisfied.
- CAD software was utilized to model each component of the display.
- Materials were chosen based on cost, availability and corrosion resistance.
- MATLAB code was created to determine the appropriate lengths of xylophone components along with their node locations.
- Prototypes of each musical attachment were fabricated and assembled.
- Tests for tonality and overall safety were conducted to ensure the functionality of the display.
- A final prototype was delivered to Discovery Space for further testing with children.
- Feedback from Discovery space was received and cosmetic changes were made before returning the final product.

Outcomes
- The “Musical Barrel” provides Discovery Space with an outdoor exhibit with the ability to be easily relocated.
- The display features instruments that are individually tuned to distinct musical scales.
- The size of the display allows for up to 6 users at once.