

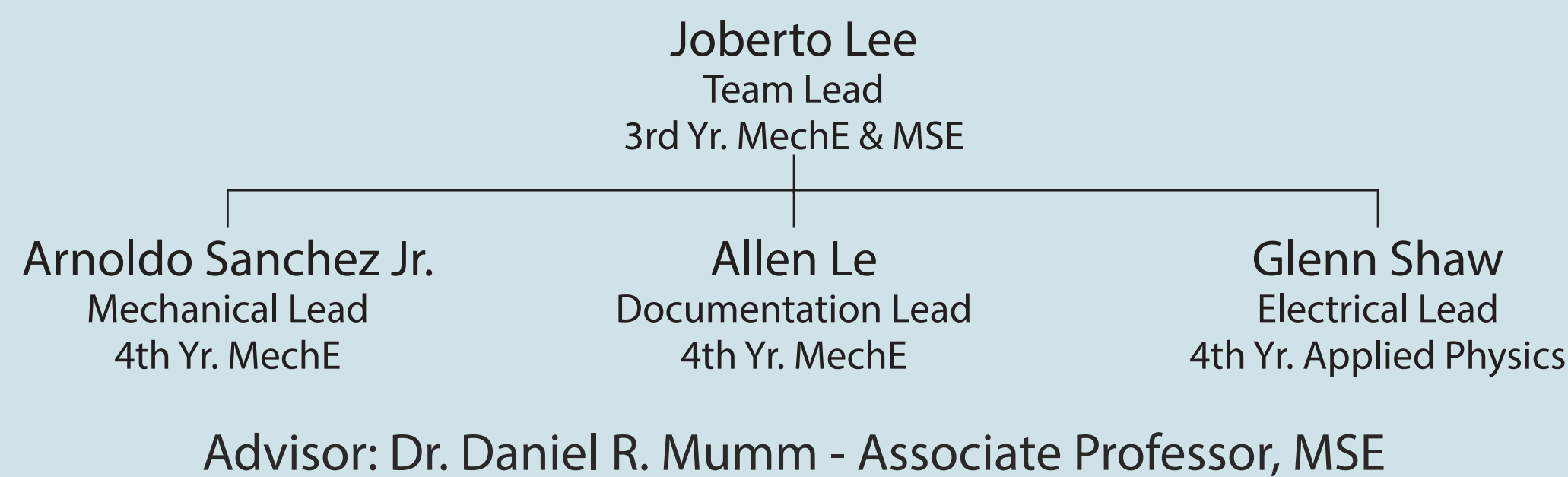
Background

This project revolves around the design of a device which retrofits existing chain or cord driven shade systems to be automated and controlled via voice commands to the Google Assistant. With the design of this device, we will tackle three problems. Firstly, automating shades can reduce energy bills by regulating heat flow through windows on timed cycles. Secondly, it will solve problems with inconveniences associated with accessing shades on inconveniently placed windows - this is especially relevant for elderly persons. Lastly, we aim to design a system which is versatile, low cost, and reliable in order to fill a hole in the smart home device market.

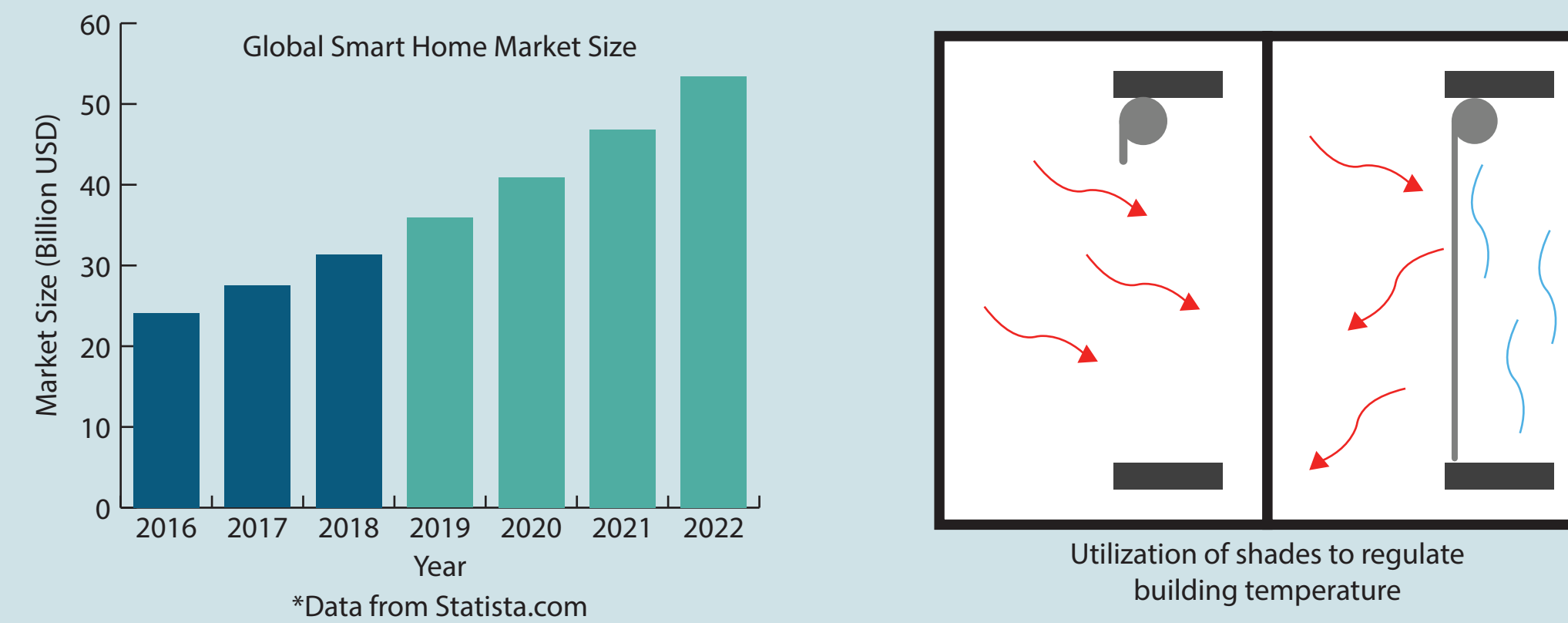
Requirements

- The product should be able to
- Articulate movement of a shade system for a window (Up to 16 ft²)
 - Fully extend/contract within 15 seconds
 - Interface with beaded chains (3-6 mm) or cords (2-6mm)
 - Mount to a wall or ledge via screws or adhesive strips
 - Be compact and only occupy one power outlet
 - Be added to a user's Google home ecosystem within 5-10 minutes

Team Members



Graphics



Budget



Innovation & Big Picture

There are a few other similar devices on the market, but each has its own flaws. We are innovating in this market by designing a device to retrofit existing shade systems. The only other device like ours requires an additional hub, which ours will not. In terms of the big picture, we've noted the steadily increasing size of the smart home device market and have intentions of bringing this device to market.

Goals & Objectives

The goal for the Smart Home Device 2018-2019 team is to create a working prototype for a chain-driven shade add-on which raises and lowers the shade via voice commands to the Google Home Assistant.

Mechanical Objectives

- Construct a model window frame
- Design and fabricate a versatile motor-chain interface
- Design and fabricate housings for the motor and electronics

Electrical Objectives

- Design and implement a power delivery system for our device
- Design a custom printed circuit board for our device

Computer Science Objectives

- Learn relevant coding languages (Arduino, Python, HTML, JavaScript, etc)
- Flash microcontroller with either Arduino or MicroPython firmware
- Code microcontroller client to read and write to a cloud-based database
- Utilize device state information from the database to alter device state
- Implement voice control via the Google Home Assistant

Current Status & Future Plans

Where we're at

- Some proposed designs have been drawn in Solidworks
- We wired a power delivery system adequate for prototyping
- We created an arduino server which can be accessed from anywhere
- We wrote a python code for reading and writing to our cloud database
- We can edit the database using commands to the Google Assistant

Coming Soon

- We will finish most of the documentation over winter break so we can spend the winter quarter focusing on the actual project
- We will finalize mechanical designs for fabrication
- We will work on designing a more compact power delivery system
- We will research the process for designing a custom printed circuit board
- We will modify the Python code for use on our MicroPython based ESP32 microcontroller

