PureStep

Overview
Hospital acquired infections (HAI's) account for 1.7 million infections and cost U.S. Hospitals $9.8 billion each year. HAI's are largely spread by unclean footwear in hospitals. The PureStep anti-germicidal device is designed to disinfect footwear using UVC radiation.

Objectives
The goal of this project was to design and manufacture a prototype of the PureStep anti-germicidal device. The device should be designed with manufacturing, safety, and aesthetics in mind. It should detect when a person stands on the device and turn on the UVC lights. When the person steps off, power to the device is cut.

Approach
- Met with sponsor to determine customer needs
- Review patents and documentation on older prototypes
- Research to determine kill rates of different infections when exposed to UVC
- Materials selection for face plate and enclosure
- Mechanical analysis by FEA and hand calculations
- Create several design proposals and create CAD renderings
- Presented design proposals to sponsor and narrowed down to final design
- Gather and order bill of materials
- Fabrication of aluminium enclosure
- Assemble electrical components and program mbed prototyping board
- Calibration and final testing
- Prototype will be sent to University of Scranton for independent testing

Outcomes
- The project produced a brand new prototype that fulfils the customer needs:
  - Machined aluminium body
  - Disinfection by UVC anti-germicidal bulbs
  - Built-in safety features
  - Predicted 95% disinfection rate
  - Could reduce the spread of Hospital Acquired Infections and save lives while reducing medical costs by billions