The VorTic Adjustable Wristband

Overview
VorTic asked us to redesign their adjustable wristband in order to create a more functional locking mechanism and an overall more affordable product. Their current locking mechanism involved many distinct parts and a coil spring that would not be effective at the actual scale. Additionally, VorTic requested we have a metal model for the final design showcase. The previous semester’s team received a quote at $10,000 for this model; therefore, we needed to focus on design for manufacture to reduce the cost.

Objectives
Our objective was to develop a simpler, more effective locking mechanism and to decrease the overall cost of manufacturing the adjustable wristband.

Approach
- Developed a set of customer needs and target specification to be met through discussions with our sponsor and as consumers ourselves
- Researched existing products and patents that utilized similar technology
- Developed several possible locking mechanism concepts and selected the most effective design
- Visited a local watch maker to gather supplies and get design feedback
- Updated CAD models to reflect our new locking mechanism design
- Reduced material and redesigned links for increased safety and affordability
- 3D printed a three time scale prototype of the locking mechanism and links
- Performed Finite Element Analysis (FEA) on high stress parts to ensure high factors of safety
- Obtained initial quotes for a metal 3D print at $2300
- Redesigned complex parts to be laser cut in 2D
- 3D printed redesigned parts at three times scale for the prototype
- Obtained new quotes for 3D printing at a lower tolerance at $350 and for laser cutting at $60
- Machined metal 3D parts for a better fit
- Assembled a fully functional prototype from the plastic 3D printed parts
- Performed usability and functional tests to prove the success of our design

Outcomes
- Cost for producing the wristband was decreased from $10,000 to $390
- The project resulted in a consistently effective adjustable metal wristband that can be tightened, loosened and then locked in place to perfectly fit the wearer’s wrist.