

# Lerner Exoskeleton I

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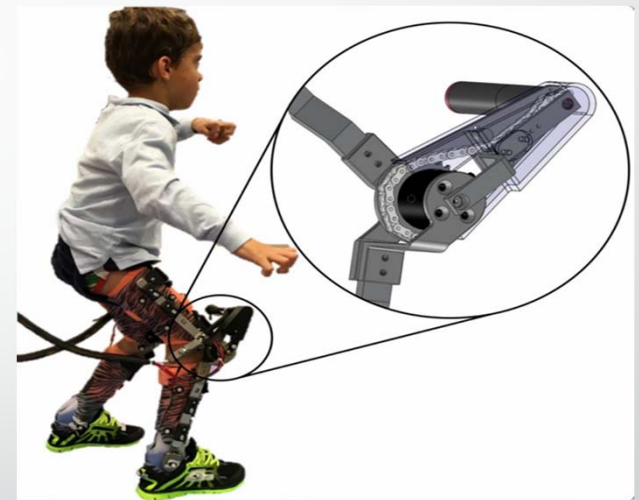


# Introduction

- Project Description.
- Design Description.
- Design Requirements.
- Schedule & Budget.

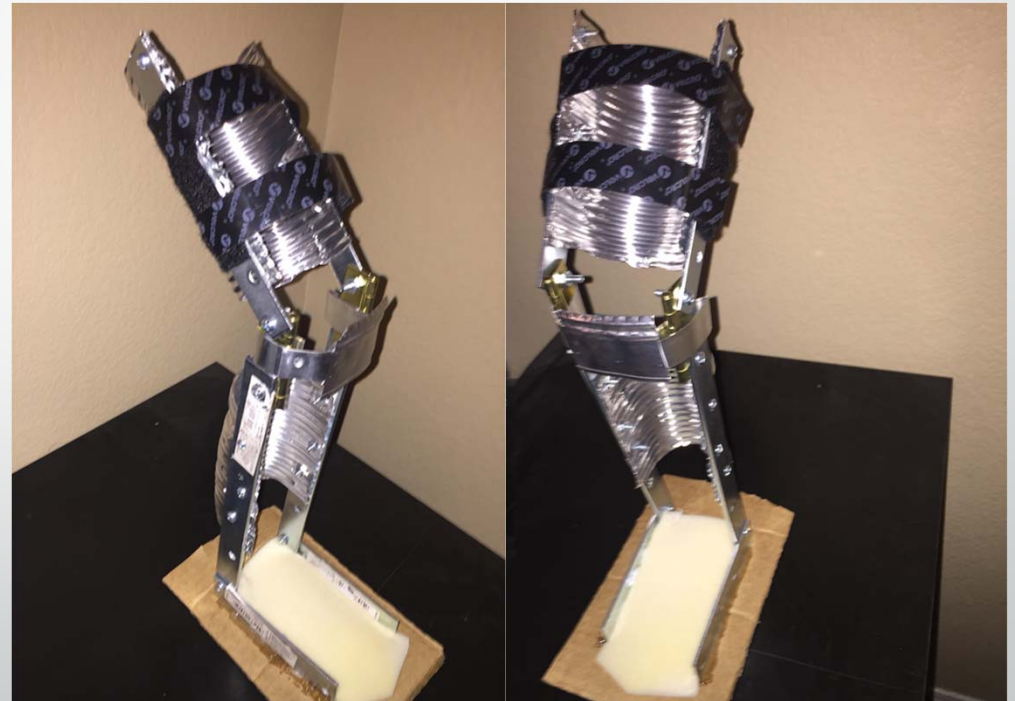
# Project Description

- The goal is to design adjustable system to help the disabilities people to walk from (13-75) ages.
- Robotic exoskeletons help neuromuscular disorder to walk.
- System provide assistance at the knee and ankle joints.
- Our Client is Zach Lerner, Ph.D, director of NAU's Biomechatronics Lab.



*Figure 1: Adjustable Human-Exoskeleton Mounting Interface*

# Design Description



# Design Description

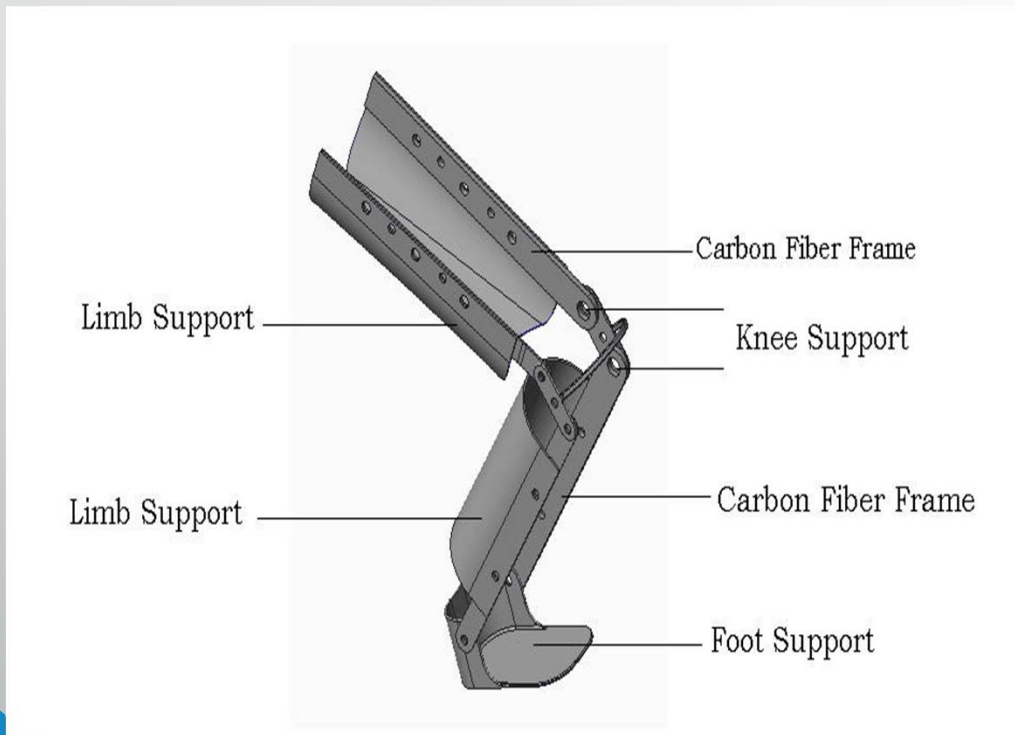


Table 1: Functions and Details ( Design Considerations)

- Provide rigid support at knee and ankle.
- Lightweight and strong material for frames like ( Carbon Fiber ).
- Adjustable length of frame for people from different ages between (13-75).
- Adjustable fabric belts for different limb size.
- Skin irritations is minimized by using Carbon Fiber and fabric belt.
- Foldable design that can be disassembled into small parts for transportation.

# Design Requirements

Table 2 : Customer requirements.

<b>Customer Requirements:</b>	<b>Weight</b>
• Rigid mounting points.	5
• Adjustable.	3
• Easy to do on and off.	2
• Minimize skin irritation.	4
• Low profile foot portion.	4
• Lightweight.	5
• Strong material.	5

# Gantt Chart

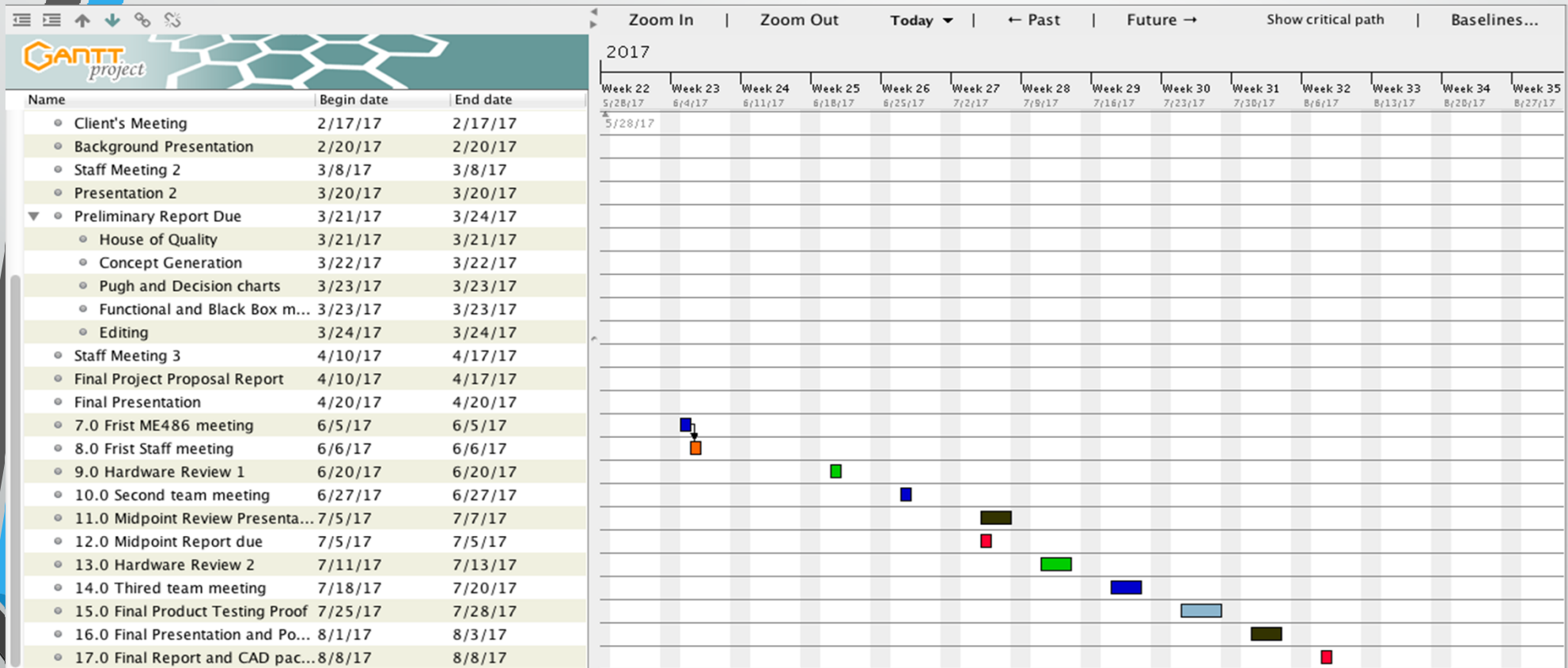


Figure 2: Gantt Chart

# Budget








- The budget is (\$500)
- Anticipated expenses ( 500\$ )
- Actual expenses ( 29.06\$ )
- Remaining ( 470.94\$ )





# Budget for Prototype

Table 3 : Bill of Materials

Materials	Cost	Materials	Cost
Machine Screw kit 	\$1.46 [1]	5 in. Steel Zinc 	\$1.78 [5]
Velcro Tape, 3/4" x 15' 	\$11.92 [2]	4 in. Zinc Plated (2-Pack) 	\$2.49 [6]
2 ft. Aluminum Vent Pipe 	\$3.88 [3]	10 in. Zinc-Plate 	\$2.78 x2 [7]
Brass Hinge 	\$1.97 [4]	Total	\$29.06

# Next Plans.

- **Remaining two weeks on Spring:**
  - Finalized prototype.
  - CAD package.
- **Pre-Summer break**
  - Start finding the required items for our design.
- **Summer term**
  - Start working to finish our final design and required documents by following the tentative schedule.

# References

- [1] <https://www.walmart.com/ip/Bulldog-Hardware-8-Screw-Value-Kit-Silver/48003206>
- [2] <https://www.walmart.com/ip/Velcro-Usa-90276B-3-4in-X-15-Black-Sticky-Back-Tape/19870069>
- [3] <http://www.homedepot.com/p/Deflect-o-2-ft-Aluminum-Vent-Pipe-DP244/100145866>
- [4] <https://www.walmart.com/ip/Bulldog-Hardware-2.5-Brass-Utility-Hinge-Brass/48003220>
- [5] <http://www.homedepot.com/p/Everbilt-5-in-Steel-Zinc-Plated-Mending-Plate-13615/203170045?keyword=030699136155>
- [6] <http://www.homedepot.com/p/Everbilt-4-in-Zinc-Plated-Mending-Plates-2-Pack-13614/203170050?keyword=030699136148>
- [7] <http://www.homedepot.com/p/Everbilt-10-in-Zinc-Plated-Mending-Plate-15390/202034036?keyword=030699153909>

# Questions?

- Thank you for your attention.