

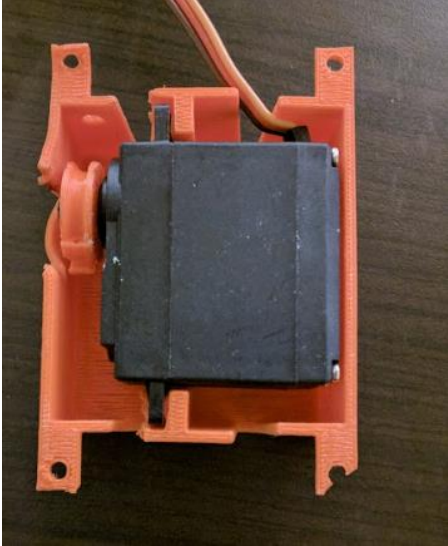
ACTION ITEMS

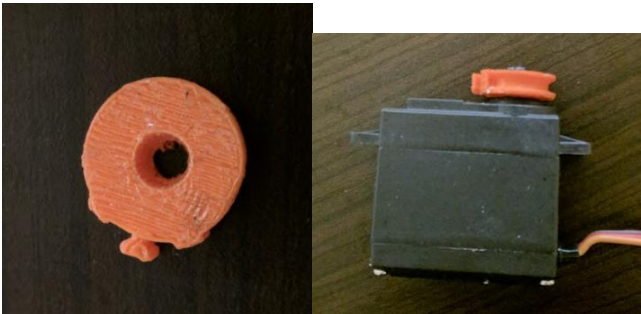

TEAM 12: Active Prosthetic Arm

Due Date:
Wednesday, February 13, 2019 5:30pm

The following are the Action Items from last week:

Team Member: Felicity Escarzaga

Action Item	Date Due	Date Completed	Result/Proof of Completion
<p>Previous items Stated: 1-3</p> <p>1. Check on order for Prusa Extruder (install if arrived)</p>	2/14	2/18	<ul style="list-style-type: none"> Met with Dr. Winfree on Monday 2/18. Confirmed that Extruder was ordered. Arrival date unknown.
<p>2. Print Pulley and motorbox*</p>	2/16	2/15	<ul style="list-style-type: none"> Both pulley horn and motorbox too small. Tolerance must be increase for tight fits on makerbot. (Noted for all future prints) 
<p>3. Test Pulley on Servo motor</p>	2/18	2/15	<ul style="list-style-type: none"> Original hole too small. Was increase using a drill until plastic was pliable enough to press fit onto motor with screw.

			
<p>Additional Items Completed: 4-6</p> <p>4. Spoke with Clients Amanda and Dr. Winfree</p>		<p>2/14 2/18</p>	<ul style="list-style-type: none"> Spoke with Amanda via text message to update her and Nate of our progress. Met with Dr. Winfree to discuss project progress and design ideas. <ul style="list-style-type: none"> Idea to be implemented to cuff: Spring elbow assists instead of motorized assistance.
<p>5. Emailed EE and ME teams to set time for interteam meeting</p>		<p>2/17</p>	<ul style="list-style-type: none"> Email picture and email quote below.  <p>"Felicity Escarzaga <fhe2@nau.edu> Feb 17, 2019, 5:17 PM (3 days ago) to Ethan, Jannell, amg969, Allison, x1225, ld549, ay339, Kyle</p> <p>Hello All,</p> <p>Here is a link to a whenisgood for us to decide the best time we should meet over the next two weeks. I am sending this new link since I'm sure some of your schedules have changed since I sent the previous doodle poll. Please fill in ALL times you are available during the next two weeks.</p> <p>Thank you for your time, Felicity E. Student, Mechanical Engineering Northern Arizona University Flagstaff, Az 86001, USA Mobile:(928)362-9096</p> <p>http://whenisgood.net/ehwbigb"</p> <ul style="list-style-type: none"> Team will meet on Monday 2/24 at 1:00 PM based on member availability.


Fri 22 Feb	Sat 23 Feb	Sun 24 Feb	Mon 25 Feb	Tue 26 Feb	Wed 27 Feb	Thu 28 Feb	Fri 1 Mar	Sat 2 Mar	Sun 3 Mar
6:00 am	6:00 am	6:00 am	6:00 am	6:00 am	6:00 am	6:00 am	6:00 am	6:00 am	6:00 am
7:00 am	7:00 am	7:00 am	7:00 am	7:00 am	7:00 am	7:00 am	7:00 am	7:00 am	7:00 am
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am	8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
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4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm
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6:00 pm	6:00 pm	6:00 pm	6:00 pm	6:00 pm	6:00 pm	6:00 pm	6:00 pm	6:00 pm	6:00 pm
7:00 pm	7:00 pm	7:00 pm	7:00 pm	7:00 pm	7:00 pm	7:00 pm	7:00 pm	7:00 pm	7:00 pm
8:00 pm	8:00 pm	8:00 pm	8:00 pm	8:00 pm	8:00 pm	8:00 pm	8:00 pm	8:00 pm	8:00 pm

6. Print cuff and assemble cuff

2/16-2/18

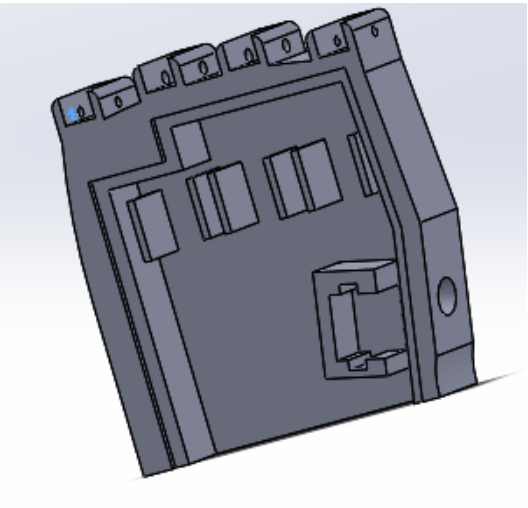
- Electronic boxes did not form as well as intended.
- Cuff is much larger than needed even if padding were to be added.
- Redesign for attachments will be needed.



7. Redesign Visualized		2/19	<p>Redesign:</p> <ul style="list-style-type: none"> • No hinge or thermoforming. Print "as is". • 1/8" thickness with 40% infill should be sufficient strength without shear. • Electronic and spring attachments can be printed directly to avoid thermal deformation. • Current size 10". Increase to allow .25" padding. • Need to add ventilation. 
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Team Member: Antoinette Goss

Action Item	Date Due	Date Completed	Result/Proof of Completion
begin design of CAD palm with newer modifications	Feb 13	2/20/2018	With the ball and socket modification, that component was no longer needed. The palm hole was made bigger for easier construction and to allow for the wires to be placed where they are needed. Fingers may need adjusting but with a finger printed, the palm can be printed by end of day and confirm if the size is correct.

			
Collaborate with team on understanding of both forearm and finger attachment	Feb 13	2/17/2019	Forearm is still being considered but it is understood that no rotation movement is necessary for the mobility as of yet which means the pal can be simple. no real modification of finger placement is necessary as of today.
Assign individual analysis research	Feb 20	2/17/2019	I have been assigned to understand and test different hinge and connection components for the arm to determine the most secure and aesthetically pleasing part. as well, it will likely alter my design depending if a new design is more suitable.
Begin research on Individual analysis	2/20/2018	2/20/2018	Research will focus on the stress that a hinge vs pin connection can take. This will likely be another experimental test for the analysis.


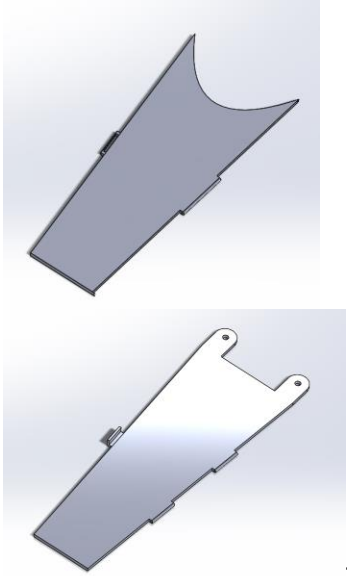
Team Member: Jannell Broderick

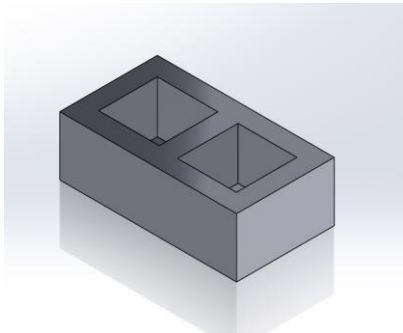
Action Item		Date Due	Date Completed	Result/Proof of Completion
Pint fingers		Feb 20	Feb 20	print CADs.
Updated SolidWorks CAD Design of Proximal Digits (2-4)		Feb 20	Feb 19	The proximal digit (finger bone closest to the palm) Cad Design for fingers 2-4 (pointer through pinky). These proximal digits are all identical except in size. They will involve a hinge so the fingers can bend to grasp items.

				<ul style="list-style-type: none"> Digit 2 Assembly.SLDASM Distal_Digit 2.SLDPRT Distal_Pin_Digit 2.SLDPRT Proximal_Digit 2.SLDPRT
Updated SolidWorks CAD Design of Distal Digits (2-4)		Feb 20	Feb 19	<p>The Distal digit (finger bone farthest to the palm) Cad Design for fingers 2-4 (pointer through pinky). These proximal digits are all identical except in size. They will involve a hinge so the fingers can bend to grasp items.</p> <ul style="list-style-type: none"> Digit 2 Assembly.SLDASM Distal_Digit 2.SLDPRT Distal_Pin_Digit 2.SLDPRT Proximal_Digit 2.SLDPRT
Updated SolidWorks CAD Design of Proximal Digit 1 and rotato		Feb 20	Feb 19	<p>The proximal digit (finger bone closest to the palm) Cad Design for fingers 1 (Thumb). It will involve a hinge so the fingers can bend to grasp items. This design is altered from the original design. The new design can revolve and bend. This, allows the thumb to create the range of motion of a ball and socket.</p> <ul style="list-style-type: none"> Digit 2 Assembly.SLDASM Distal_Digit 2.SLDPRT Distal_Pin_Digit 2.SLDPRT Proximal_Digit 2.SLDPRT
Updated SolidWorks CAD Design of Distal Digit 1		Feb 20	Feb 19	<p>The Distal digit (finger bone farthest to the palm) Cad Design for fingers 2-4 (pointer through pinky). This differs from the other fingers because it will incorporate a ball and socket joint rather than a hinge.</p> <ul style="list-style-type: none"> Digit 2 Assembly.SLDASM Distal_Digit 2.SLDPRT Distal_Pin_Digit 2.SLDPRT Proximal_Digit 2.SLDPRT

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Team Member: Allison Cutler

Action Item	Date Due	Date Completed	Result/Proof of Completion
Thermoform forearm halves using the mold to test the practicality of both designs	Feb 20	Feb 19	 <ul style="list-style-type: none"> • The mold is too large and the flat pieces cannot fully fold over. Must reduce mold diameter • Need to acquire larger containers for thermoforming
Make alterations to designs based upon thermoforming test	Feb 20	Feb 20	<ul style="list-style-type: none"> •  <p>The amount of clips and hinges were reduced in order to reduce variability and error when thermoforming</p>

Begin designing servo motor holder in SolidWorks	Feb 20	Not Complete	 <ul style="list-style-type: none"> Motor design originally sketched needed to be altered due to servo motor size. New sketches were made but the SolidWorks CAD has not been completed. Dimensions need to be reevaluated
Work with Felicity on possible pulley mechanism between motors in arm and finger movement	Feb 17	Not Complete	<ul style="list-style-type: none"> Team meeting was spent preparing for Hardware Review and the focus was major CAD components. This pulley mechanism is a smaller component and was pushed back in priority, so it was not covered during this meeting
Start researching bluetooth communication possibilities and coding for analysis	Feb 20	Feb 20	<ul style="list-style-type: none"> Research in Arduino with hc-05 and hc-06 (https://howtomechatronics.com/tutorials/arduino/arduino-and-hc-05-bluetooth-module-tutorial/) Learning XBEE code with Arduino (https://www.norwegiancreations.com/2013/10/arduino-tutorial-1-lets-make-xbee-talk/) (https://learn.sparkfun.com/tutorials/xbee-shield-hookup-guide/all) From this research, most likely XBEE will be used due to the availability of the materials in Winfree's Lab, which makes testing for the individual analysis possible.

The following are the Action Items for next week:

Team Member	Action Items	Date Due
Felicity	<ol style="list-style-type: none"> 1. Calc needed spring force for elbow assist. 2. Design container for spring to attach to cuff. 3. Redesign cuff size and electronic attachments. 4. Work on Hardware Review with team 	<ol style="list-style-type: none"> 1. 2/27/2019 2. 2/27/2019 3. 2/27/2019 4. 2/22/2019
Antoinette	<ol style="list-style-type: none"> 1. complete testing on door design to see if latch design is successful. Print latch component 2. Work on individual analysis 3. Work with team on hardware review 4. Adjust palm if needed 5. Work on Hardware Review with team 	<ol style="list-style-type: none"> 1. 2/27/2018 2. 2/27/2018 3. 2/27/2018 4. 2/27/2018 5. 2/22/2019

Janelle	<ol style="list-style-type: none"> 1. OPenSim simulation of arm for individual analysis 2. work with toni to connect fingers to palm 3. test printed finger 4. Work on Hardware Review with team 5. Determine best material for artificial tendons 	<ol style="list-style-type: none"> 1. 2/27/2019 2. 2/27/2019 3. 2/27/2019 4. 2/22/2019
Allison	<ol style="list-style-type: none"> 1. Code and test XBEE and arduino communication 2. Write individual analysis report 3. Work on Hardware Review with team 4. Organize Google Drive CAD folders 	<ol style="list-style-type: none"> 1. 2/27/2019 2. 2/27/2019 3. 2/22/2019 4. 2/27/2019