When Creating the Motion Capture File:

You should have at least 22 markers for the data collection:

1: htop - (part of the hat)

2: lank - (left ankle) *

3: lear - (part of the hat)

4: lelb - (left elbow)

5: lhee - (left heel)

6: lhip - (left hip)

7: lkne - (left knee)

8: lrad - (left radius)

9: lshd - (left shoulder)

10: ltoe - (left toe)

11: rank - (right ankle) *

12: rear - (part of the hat)

13: relb - (right elbow)

14: rhee - (right heel)

15: rhip - (right hip)

16: rkne - (right knee)

17: rrad - (right radius)

18: rshd - (right shoulder)

19: rtoe - (right toe)

20: lhnd - (left hand)

21: rhnd - (right hand)

22: c7 - (c7 top of spine)

23. L5- (lower back) *

* means we are still considering if the marker is needed. As of now, **L5 is useful** and feet look better **without** the ankles in post-production.

Instructions for Cortex:

Live Mode:

- Create a new folder in widows and put your marker set in that folder.
- Zero out the force plates. (They should not be running during the trials)
- Connect to the cameras.
- To change angle/view- hold alt and right click to change the angle, hold alt and double click to change the view.
- Click quick files (top left) to select what folder you want to work in (e.g., Avatar).
- Check the recording setting (bottom left) to make sure the time constraint is correct for the length of trials that you plan to make.
- Name the trial on the bottom (e.g., MM01).
- Click the blue and white Play button to make sure all markers are visible (bottom left).
- Once everything is checked, press the pause button before you start to record.
- Click the red record button (bottom right) to start recording the trial and click the Play button to begin taking data. (do not stop the recording, it will stop on its own once the time is up).
- If there is a mistake in the trial (e.g., lose a marker, movement was incorrect) overwrite the recording of the trial by clicking the recording button – overwrite
- Before getting into post mode, make sure you disconnect from the cameras (bottom left).

Post Mode:

- Click post mode (top left of the screen).
- Make sure you are in the right folder in quick files (e.g., Avatar--> the date folder you want- 211130).
- Click top right to select what capture you want to see.
- Now select Add/Remove (top left) and select which marker set you would like to create (AVAT04). If you are using a marker set already created, links are already done for you
- Click quick ID to identify markers.
- Click create template (make sure markers selected are visible or all, then click create template and ok).
- Click rectify. Without this, the markers will only be identified in the first frame. Rectify allows for the whole trial to have the markers identified.
- For multiple trials with the same starting position, you just have to add the marker set and then click template ID for the markers to automatically be identified. Then click rectify.
- **Save capture file.** You need to do this before clicking save capture as because it will corrupt the files if not done this way.
    -"Save capture file as" You change the file name every time you re-save a capture. This prevents the capture from being replaced and stops the files from being corrupted). Adding letters to the end such as b is typical.
- To look at the xyz graphs, click "Data Views" and select "xyz graphs" or click F4. Select what marker you want to look at. To select a part of the graphs, click using the scroller on

the mouse We take a closer look at XYZ graphs to smoothen, or fix small errors in the data after trials.

-Hot Keys M- smooth, C- cubic join, F3- 3D view, F4, xyz graphs, X- cut, F- forward frame, S- backward frame

- To export anything like C3D files, force files, etc.- click setting, import/export and select what you want to export (make sure it is saving in the correct file).

Opening Files and Getting it into Blender 2.93:

- Open TRC file in excel, scroll to the right edge, and look for unnamed markers. If there are more markers than were used in the trials, there are extra ghost markers. Delete the ghost markers in excel and save as a TRC file.
- Open this TRC file in Mokka. Delete unnamed markers in here as well.
- Export it from Mokka as a C3D file
- Open the Mokka C3D file into Visual 3D.
- Export from Visual 3D as a C3D file
- Import the Visual 3D C3D file into the older blender version (2.79)
- Export it from Blender 2.79 as a BVH file. When exporting, adjust the "End Frame" and "Frame Rate" based on the number of frames in the TRC file. You can find this number at the top of the excel file. (Ex: end frame:1200, frame rate: 240)
- Open the BVH file into new blender (2.93)
- Now you can work with the motion capture file in the new version of Blender.

Creating the Blender Armature Skeleton In Blender:

In edit mode:

- Extrude armatures from marker to marker. (The armature will only properly track the marker that you extruded from at this point)
- Next, to track the other side of the armature to the marker you are extruding to, click the desired marker to extrude to, and use the snapping tool to snap the **cursor** to the marker.
- Click on the end of the extruded armature and snap it to the cursor.

In pose mode:

- If armatures aren't moving properly, use damped tracking.
- Create all armatures before starting damped track.
- Click the whole armature for damped tracking
- Go to bone constraint properties, click on add bone constraint, choose damped track under tracking.
- Set target as the motion capture armature (mo-bones).
- Select the bone you wish to track to.

- Work from outer to most inner armatures for it to work properly.

Adding Mesh Man to Skeleton:

- Open the mesh man file alone, copy him from there and paste him into your file with the armature. Specifically, into the save collection on the top-right side of the screen.
- In object mode, rotate, move, and scale the mesh man so it properly aligns with the motion capture armature
- Click the mesh man in object mode, Object Properties - Viewport Display – Display