CHARACTER RIGGING

Corso Realtà Virtuale 2025/2026

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RIGIFY ADD-ON

Blender provides a ready basic humanoid skeleton for character's rigging, it is a separate Blender's add-ons package.

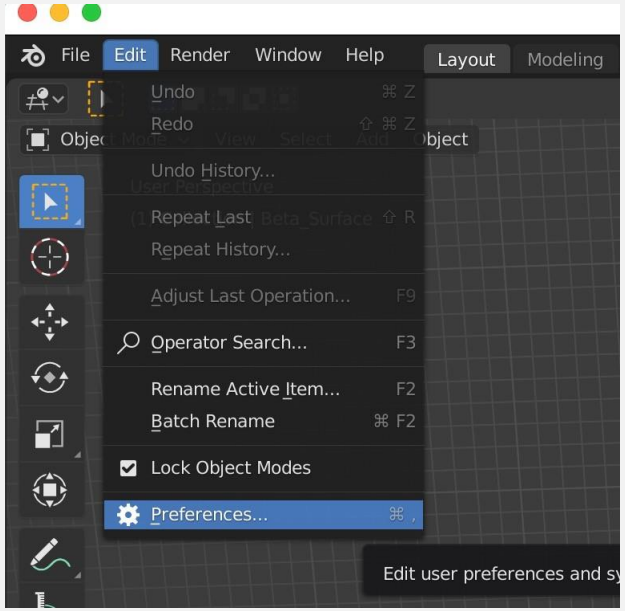
You can add Blender's Community or Official packages / tool to your project in:

1. Edit > Preferences
2. Click on Add-ons
3. You can search the package by writing a part of package's name near the lens symbol, we will search the term "rigify"
4. we will add the package "Rigging: Rigify" by checking the box

https://docs.blender.org/manual/en/latest/addons/index.html

RIGIFY ADD-ON

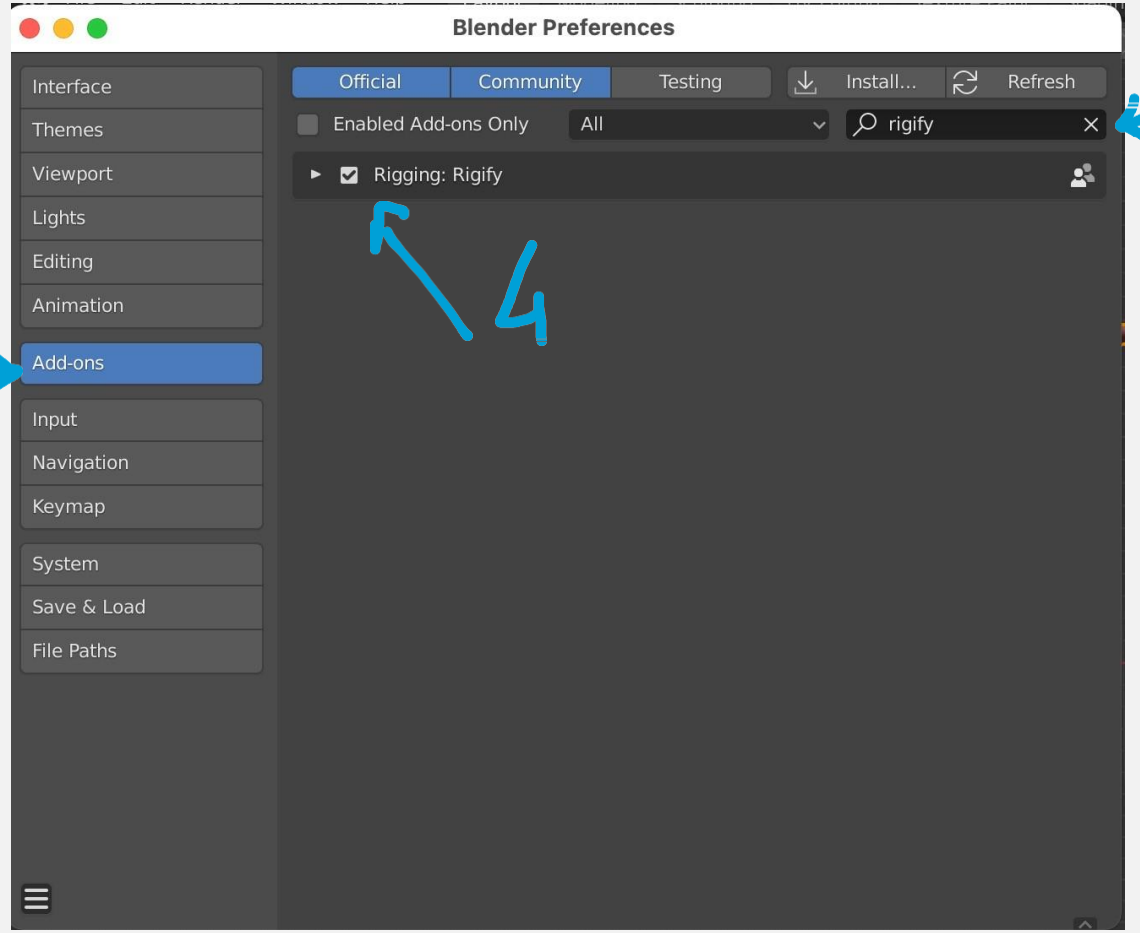
1



2

3

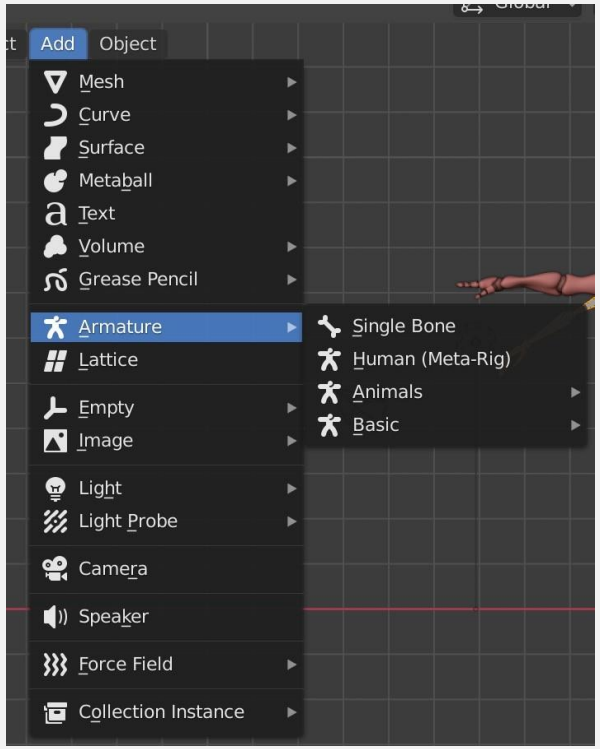
4



ADD SKELETON

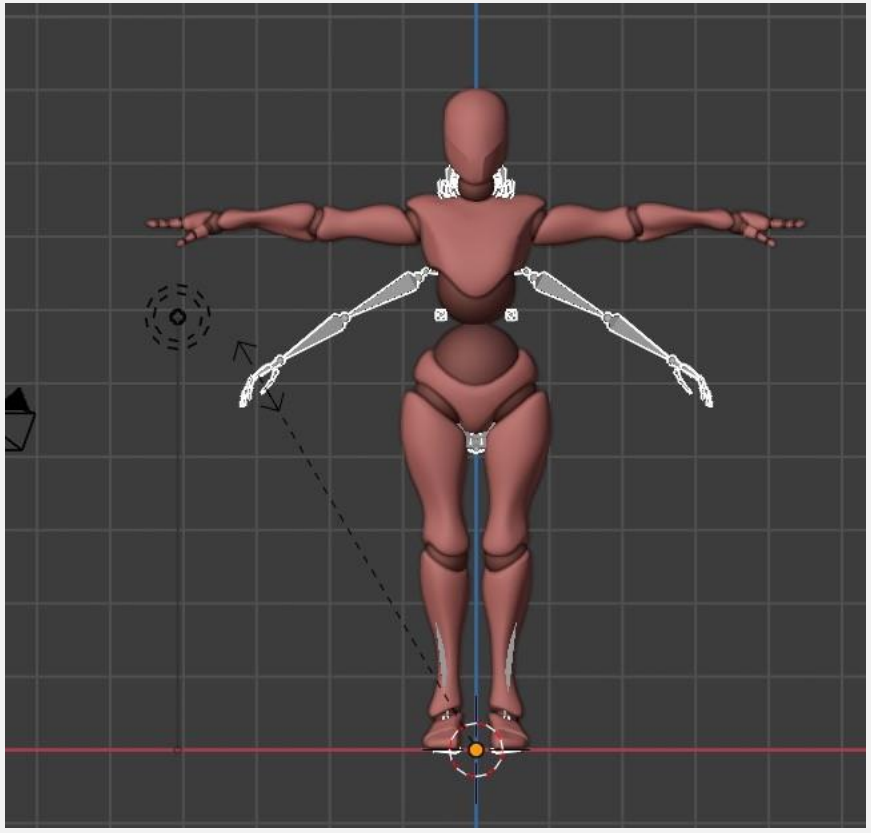
Now we will add a skeleton to the avatar:

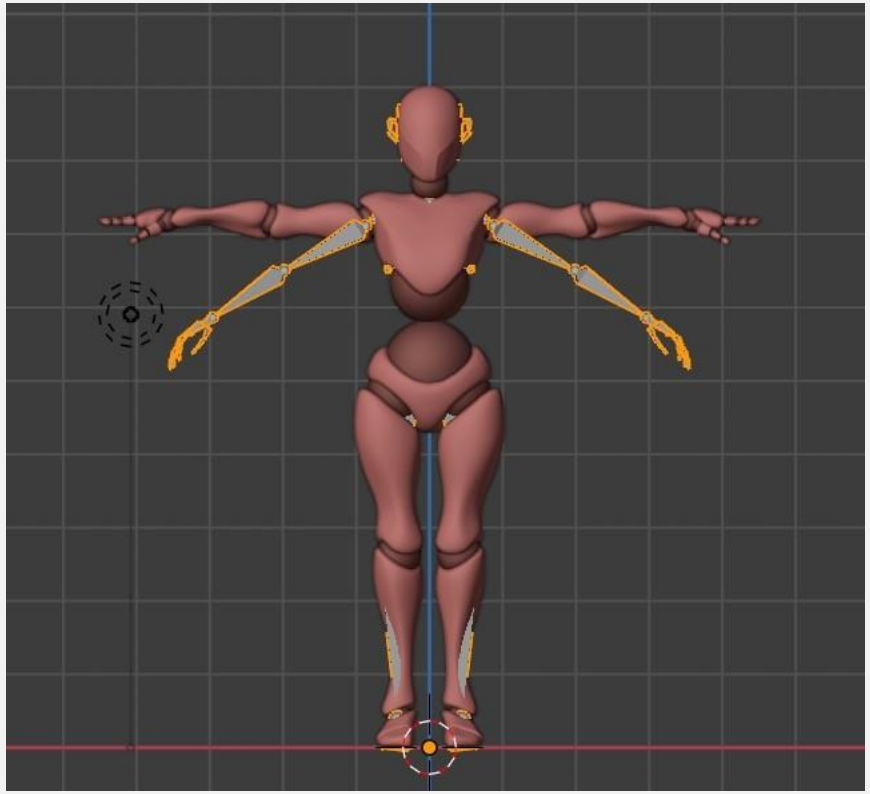
1. Click on the “avatar” collection
2. Click on Add > Armature > Human
3. Now in the “avatar” collection the object “metarig” appears, click on it



ADD SKELETON

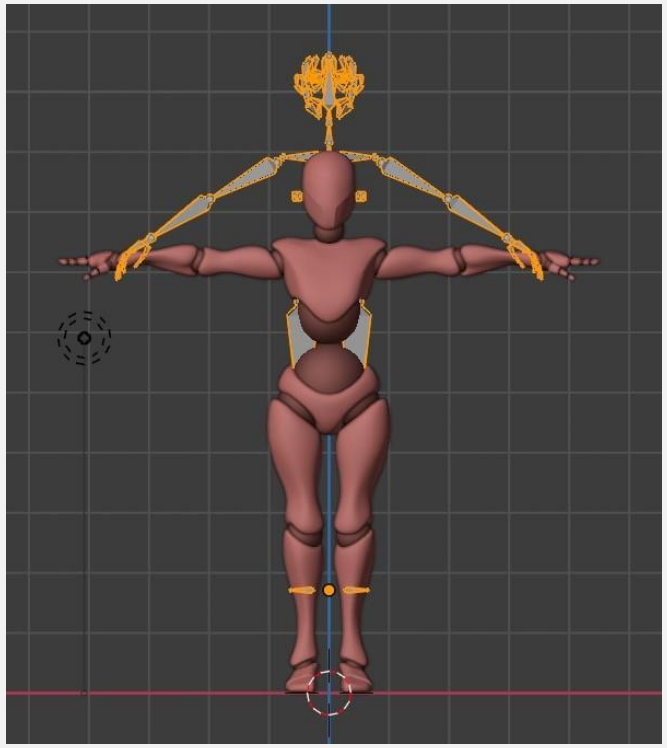
4. Scale with hotkey [S] to make it coincide with the avatar

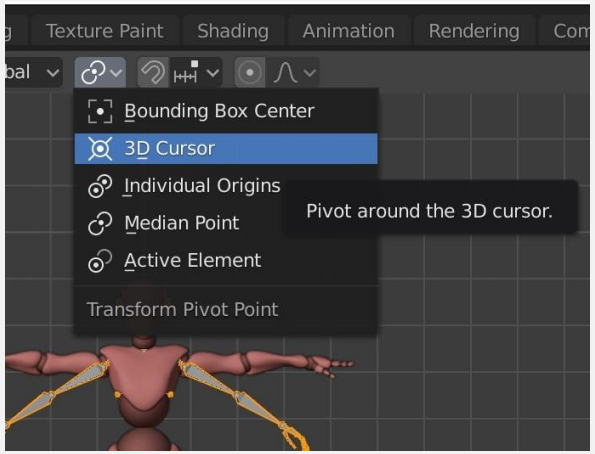


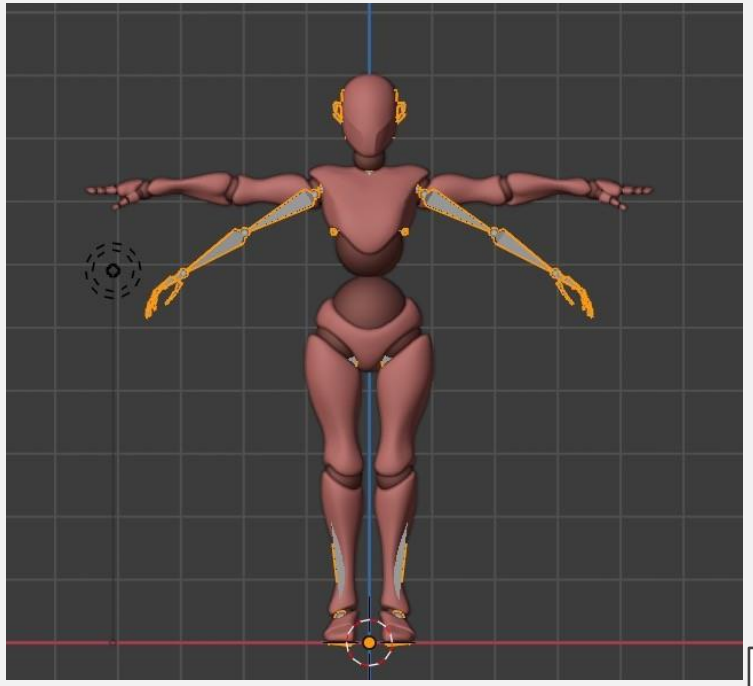


ADD SKELETON (OPTIONAL)

You can enable the Pivot around the 3D cursor before scaling to be sure that the metarig's feet will stay fixed in the same place while you are scaling the metarig







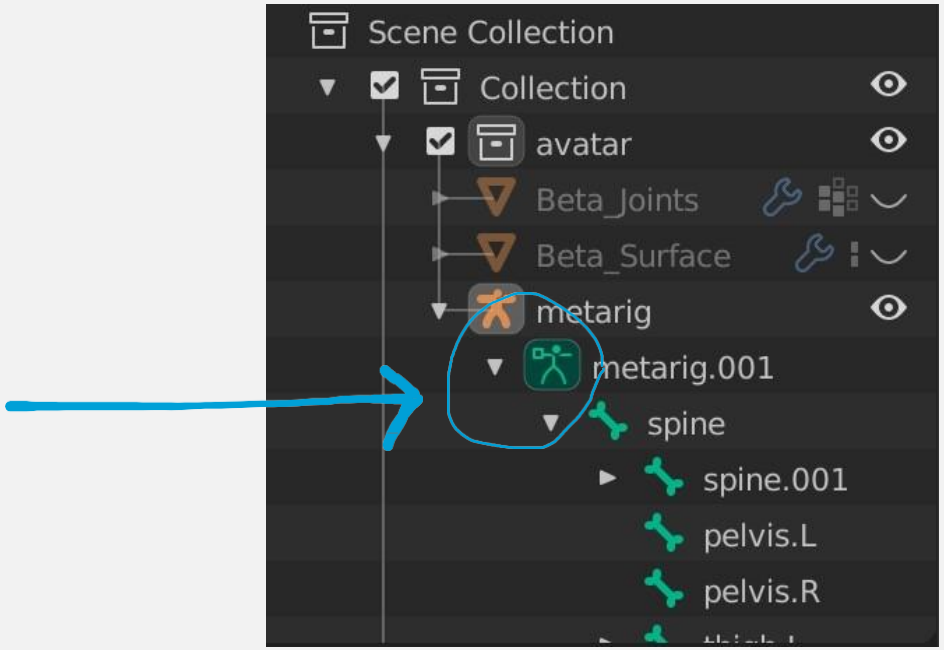
Without 3D Cursor

With 3D Cursor

CHANGE THE SKELETON

You can delete the parts of the skeleton you don't need:

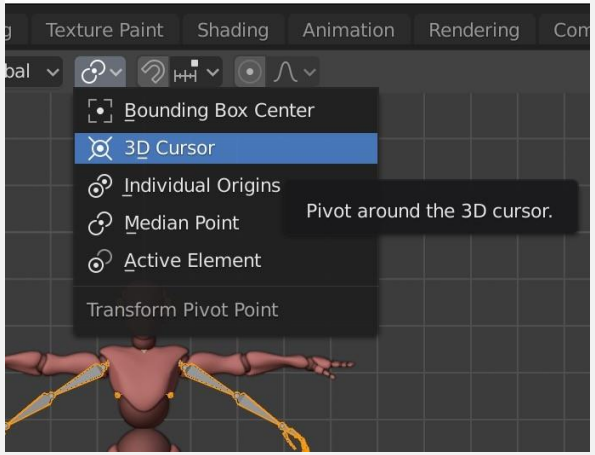
- Enable Wireframe View
- Click on the metarig green symbol to enable the selection of skeleton's parts



- Now in the viewport (with Wireframe view) you can select a single part of the metarig

Go back to pivot (OPTIONAL)

To easy adjust the bones, you should go back to the default
Pivot on Median Point

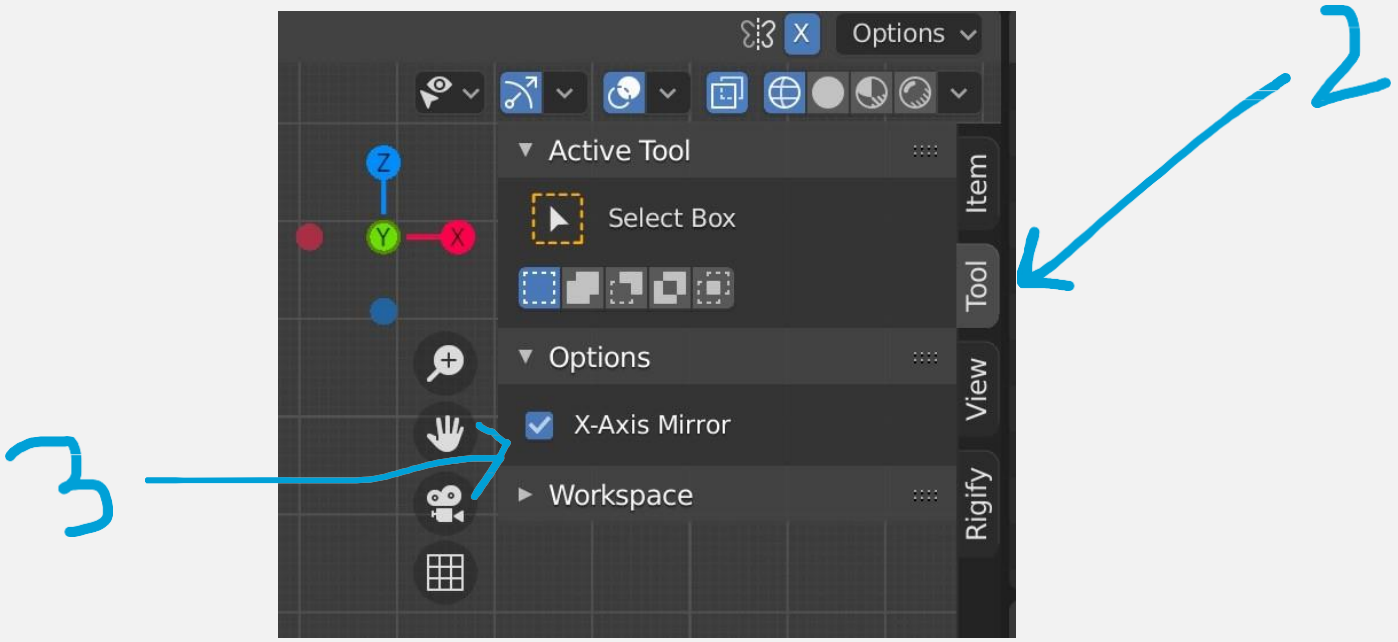


CHANGE THE SKELETON

Now you can adjust the bones to coincide with the avatar with [S] scale, [G] grab and [R] rotate.

To facilitate this step you can also enable Mirroring, to mirror the action along the x axis:

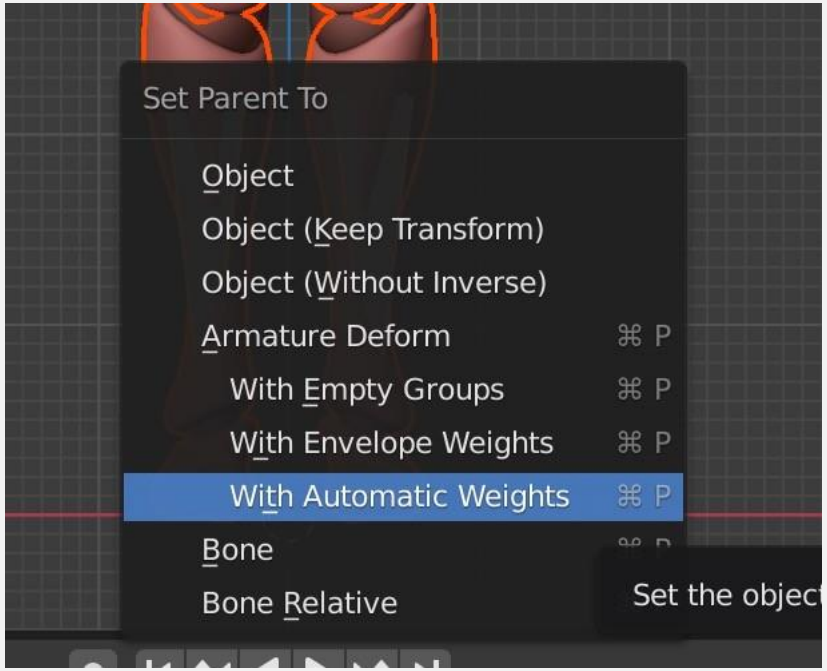
1. Press hotkey [N], now the menu appears
2. Click on "Tool"
3. Check the box X-Axis Mirror



PARENT THE MESH

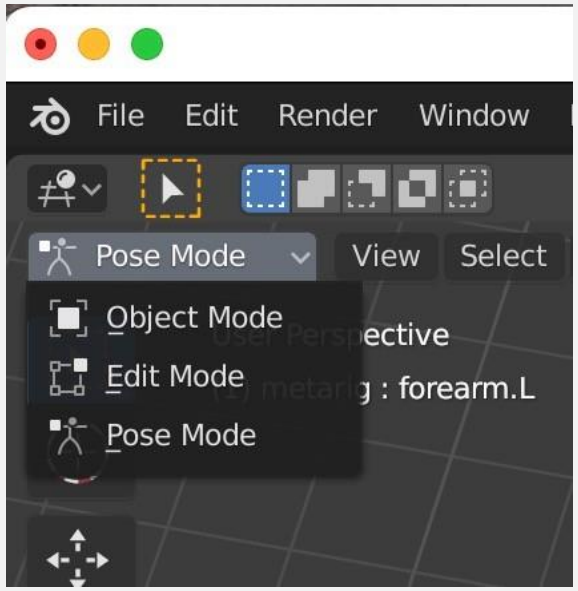
Now you can parent the avatar with the metarig:

1. Enable Solid View and switch to Object Mode
2. Click on the avatar's mesh then [shift] + click on the metarig
3. Press hotkey [ctrl][P]
4. Choose the option Armature > with automatic weights



POSE MODE

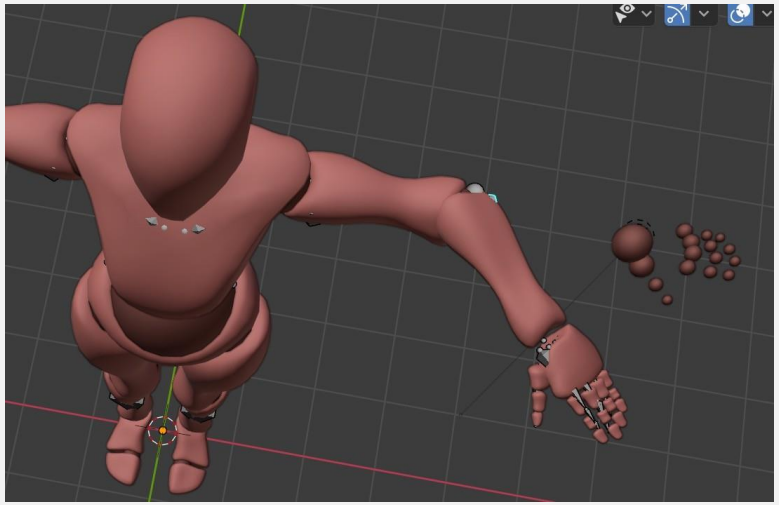
Now switch to Pose Mode



- Move a bone with [G], you will see that the avatar's mesh will follow it consequently.

REDO PARENTING

However, the mesh called Beta_Joints is still fixed

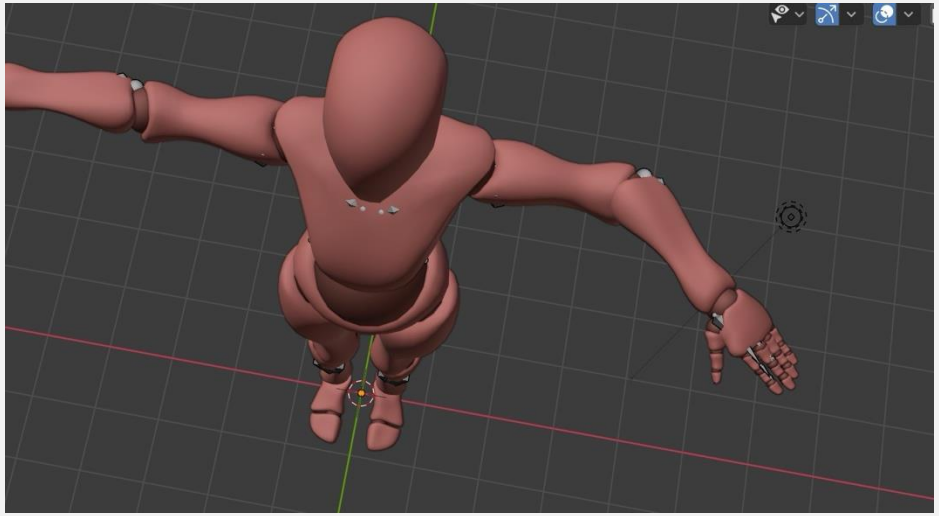


You can solve it by repeating the Steps at slide 10 "Parent the mesh" , but now instead of the avatar we will select the beta_joints part:

1. Enable Solid View and switch to Object Mode
2. Click on the beta_joints 's mesh then [shift] + click on the metarig
3. Press hotkey [ctrl][P]
4. Choose the option Armature > with automatic weights

FINAL RESULT

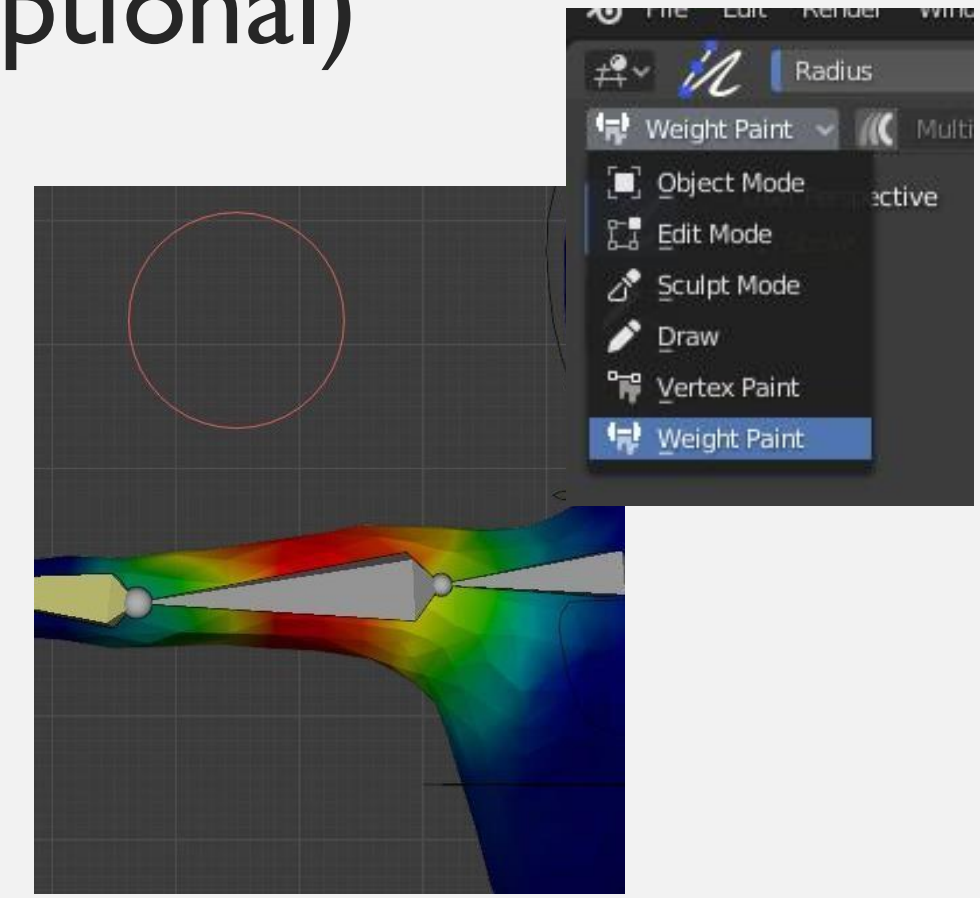
Go back to Pose Mode, now everything will follow the bone when you move/scale/rotate it



Weight Paint Mode (Optional)

If deformation is wrong, use Weight Paint to adjust each bone's influence.

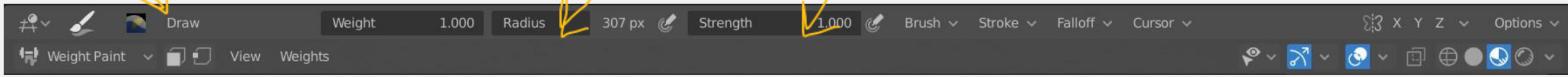
- Blue means no influence; red means strong influence.
- Select rig + mesh, choose Weight Paint, then Shift-click a bone to paint its area.



The weights can be assigned simply painting the mesh:

- use **Draw** to paint
- use **Subtract** to cancel painting

You can change the **brush size with Radius** and the **Strength**



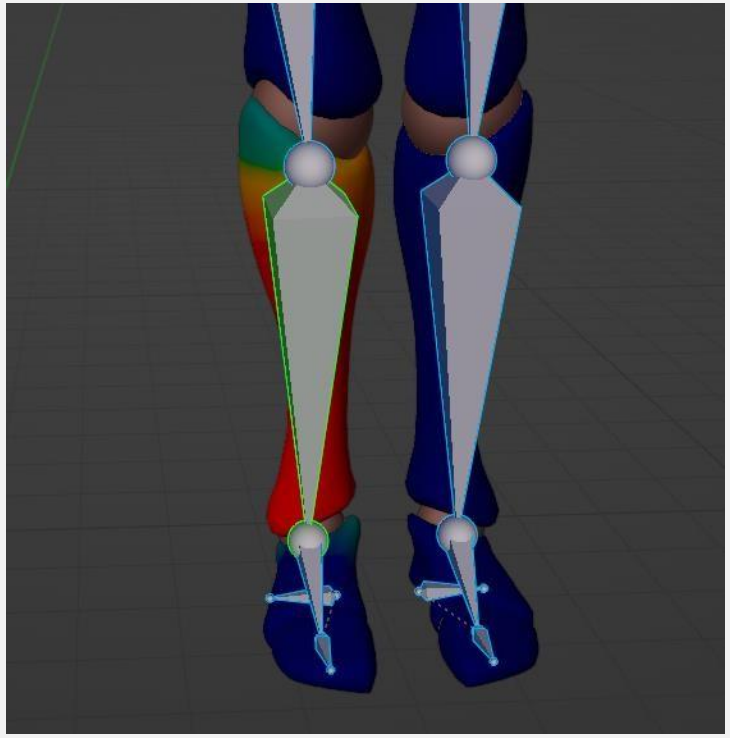
Suggested read: https://www.whizzystudios.com/post/best-practices-for-weight-painting-in-character-rigging

Weight Paint Mode (Optional)

- Select the rig and then [shift] + select the mesh
- Switch to Weight Paint Mode

You can:

- select a single bone with [shift] + left mouse button
- paint on the mesh to define the bone's influence on it

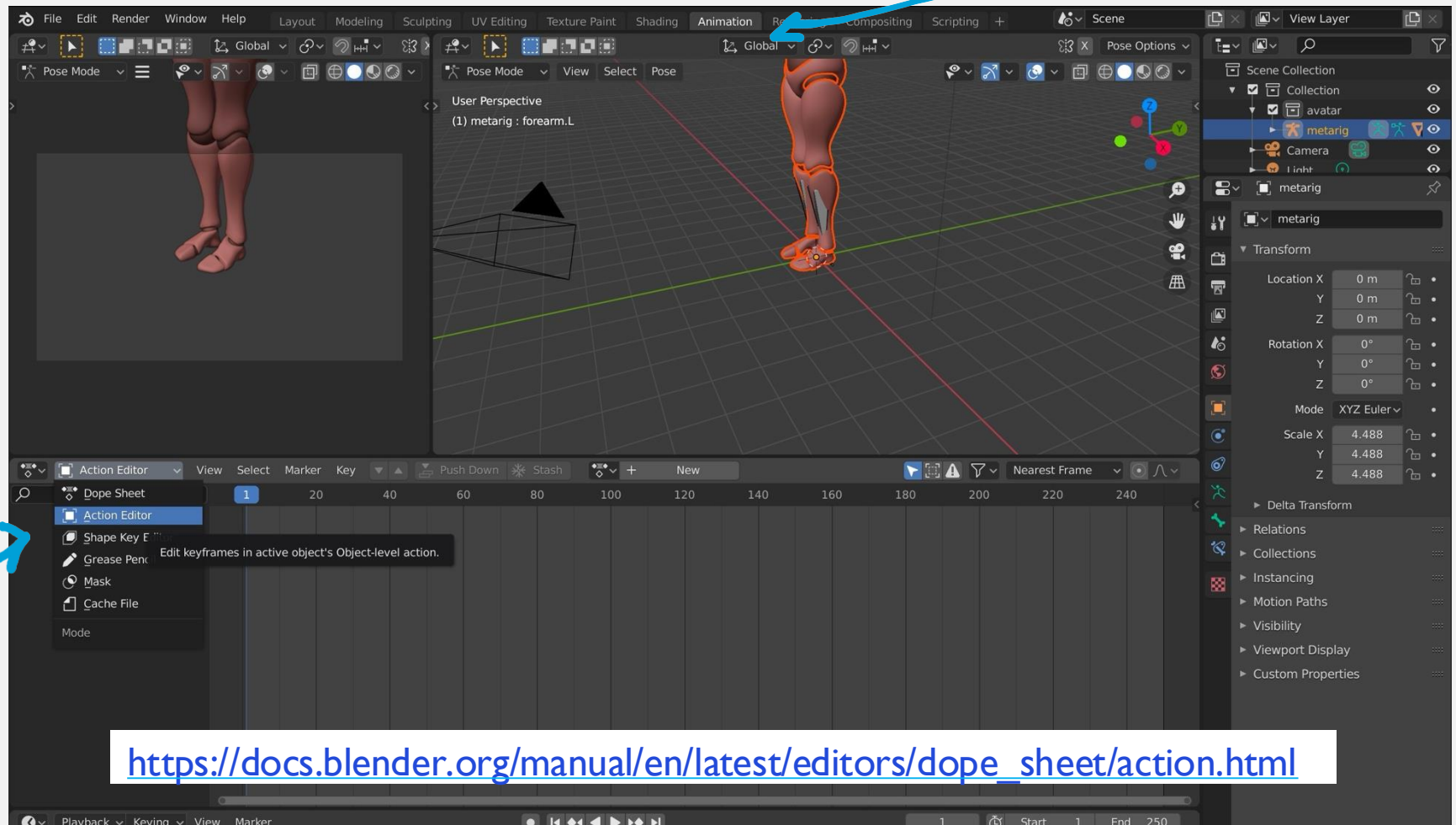


Suggested read: https://www.whizzystudios.com/post/best-practices-for-weight-painting-in-character-rigging

CREATE ANIMATIONS WITH BLENDER

You can animate the avatar in Blender and then import the animation in Unity:

1. Go to Animation tab
2. Switch from Dope Sheet to Action Editor

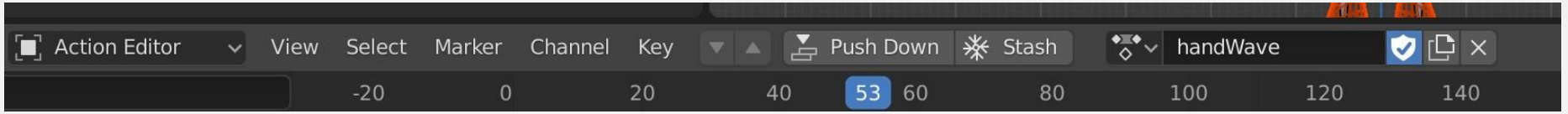


https://docs.blender.org/manual/en/latest/editors/dope_sheet/action.html

CREATE AN ACTION

A new action will be automatically generated when you will perform the step 4, otherwise, if you want to create the action before you can click on + New

When the action is created you can change the name in the text box that will appear



CREATE AN ACTION

You can create an action in the same way as an animation, we will create a Hand wave (hello sign), we will call it "handWave"

1. Switch to Pose Mode
2. Choose the timeframe (we will start with frame 1)
3. Select the hand bones, then [G] move or [S] scare or [R] rotate to adjust the hand position
4. Right click (OR push [K] shortcut) -> Add keyframe -> LocScaleRot
   At this point the action will be automatically generated, otherwise, if you want to create the action you can click on + New before performing the step 4
5. Repeat steps 2 – 4 increasing the timeframe (we will increase 10 by 10)

(Optional for Unity) Finally we will select the avatar, the beta_joints and the metarig and we will export it as an FBX (with the option "selection only" enabled) and import it in Unity,

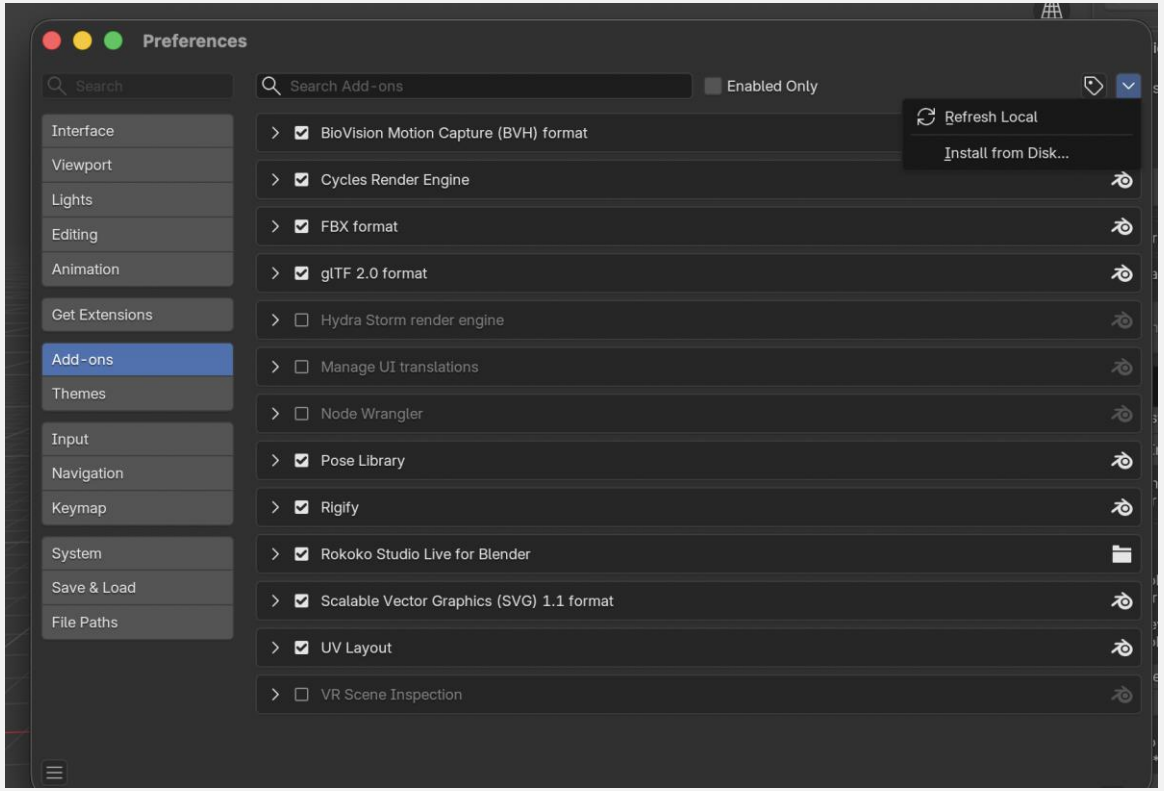
Motion Capture (Rokoko plugin)

ROKOKO SETUP

Download Rokoko plugin for Blender here:
https://www.rokoko.com/integrations/blender

Donwload the .zip (do not unfold / open it)

1. In the top menu, on the left, Select Edit > Preferences > Add-ons
2. Click Install from Disk and select the Rokoko-plugin.zip
3. Now the Rokoko add-on box appears in the list

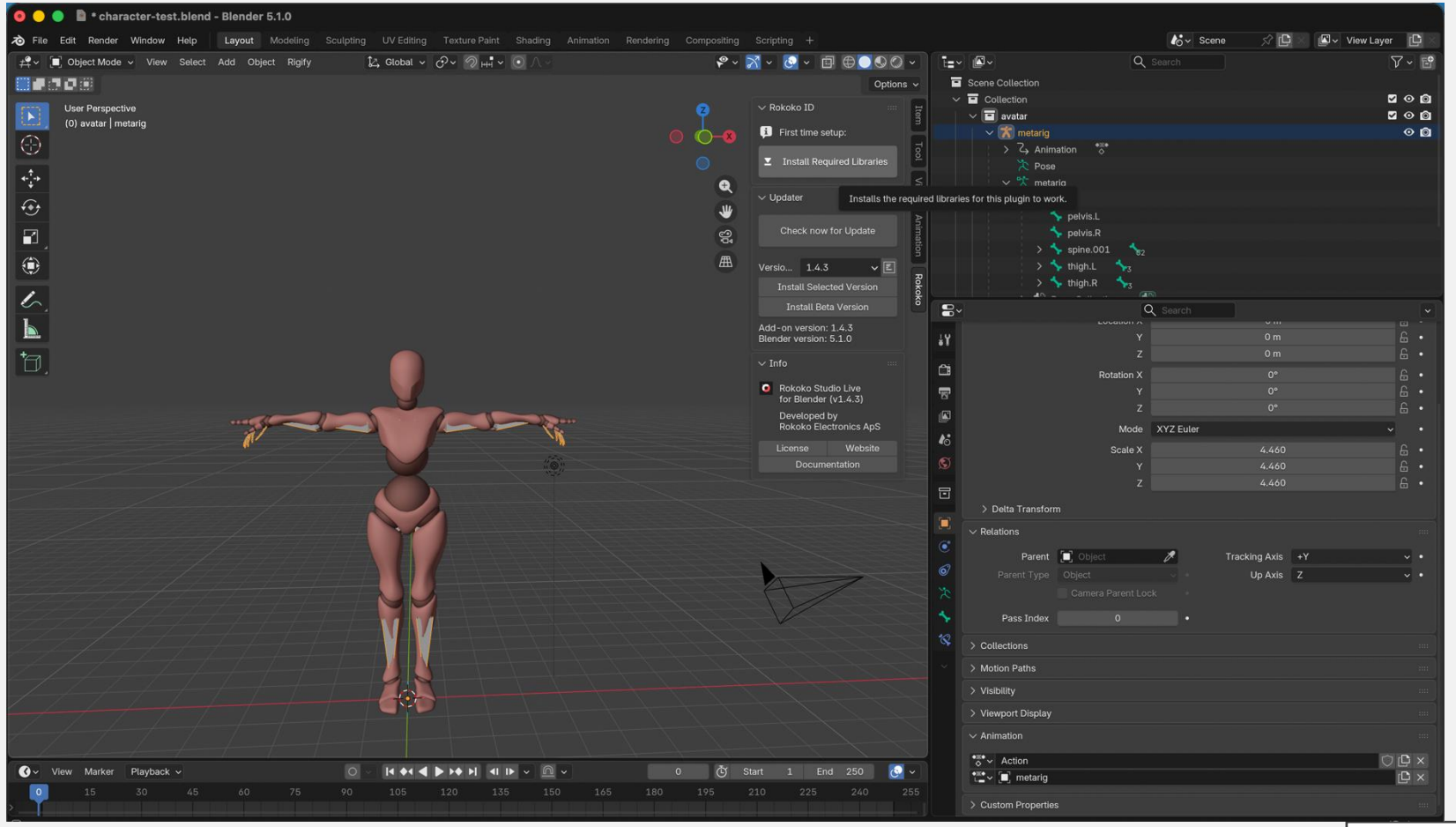


ROKOKO SETUP

Close Preferences, go to 3D view and push [N] so that the menu appears.

1. Click on Install Required Libraries

2. Now click on Sign In



DOWNLOAD MOTION CAPTURE DATA

Download motion capture data from: https://sites.google.com/a/cgspeed.com/cgspeed/motion-capture/the-daz-friendly-bvh-release-of-cmus-motion-capture-database

which consists in a large set of human motions captured with a Vicon motion capture system and converted into .bvh files

Download the Zip file for BVH directories 01-09

IMPORT BVH – MOTION CAPTURE DATA

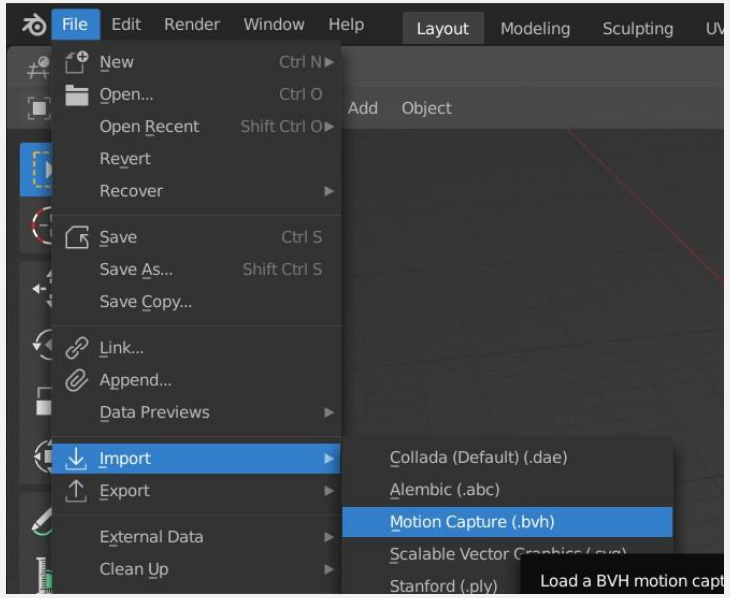
Unzip the folder with .bvh files

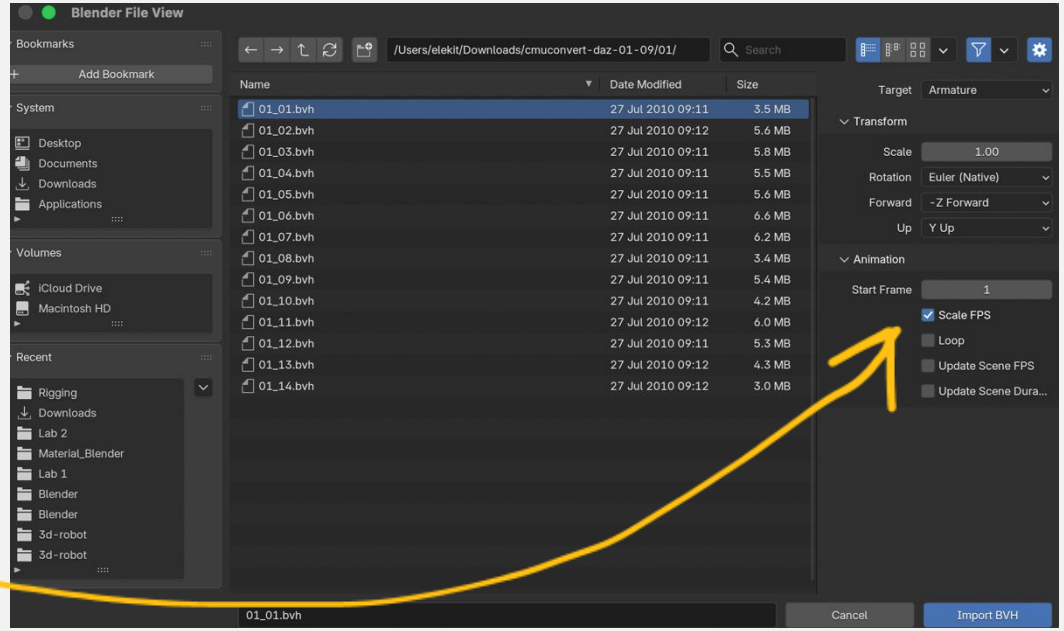
1. Create a new Blender file, open the top menu on the left, select Files > Import > Motion Capture (.bvh)

2. Navigate to bvh_files the first file in the first folder 01_01

3. Check **Scale FPS** to adjust the animation to the frame rate of our scene, and confirm

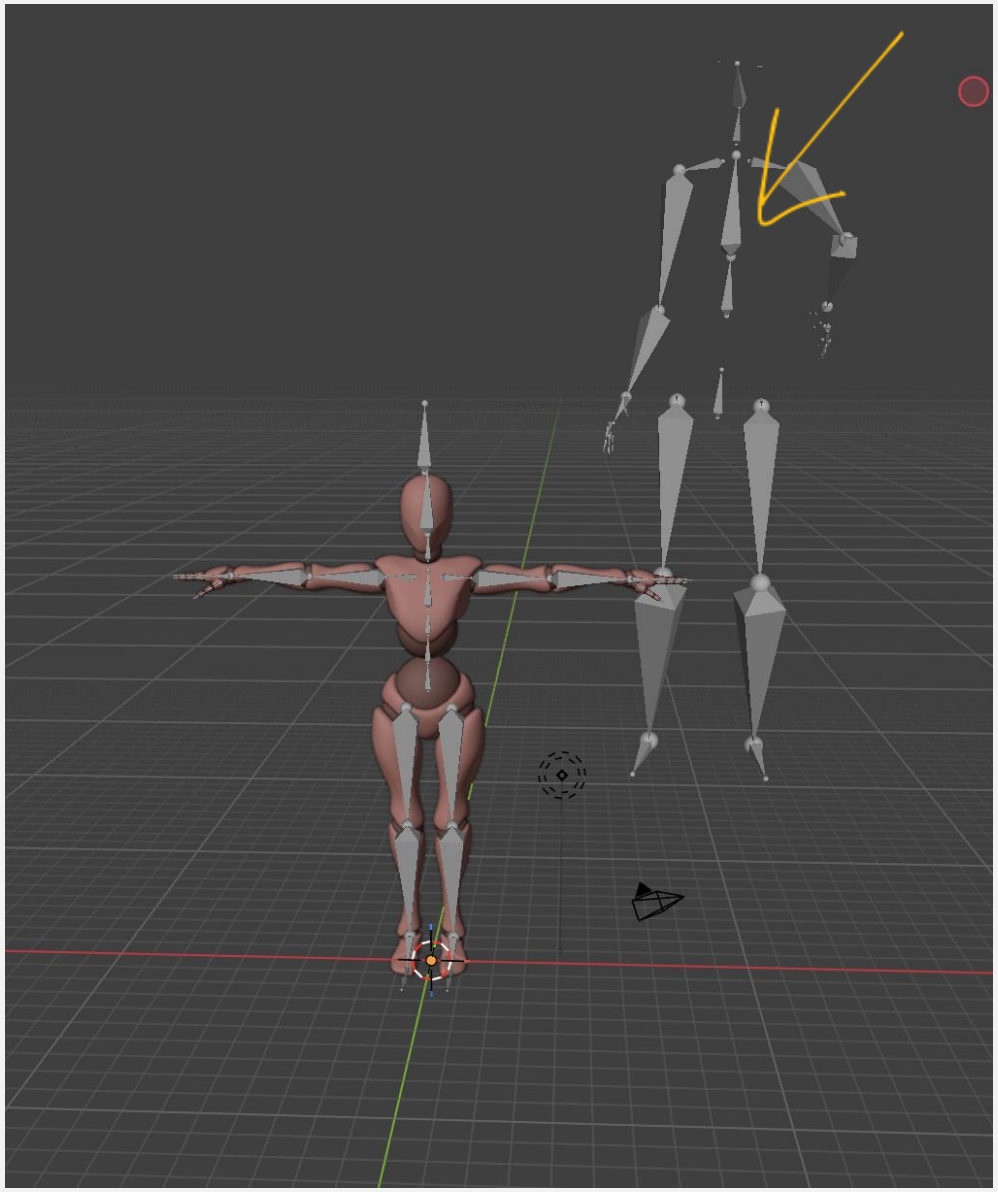
(you can check the fps of the scene in the Output panel)





Scale

Now a BHV rig without mesh appears, scale it and reduce its dimension to fit the size of our character



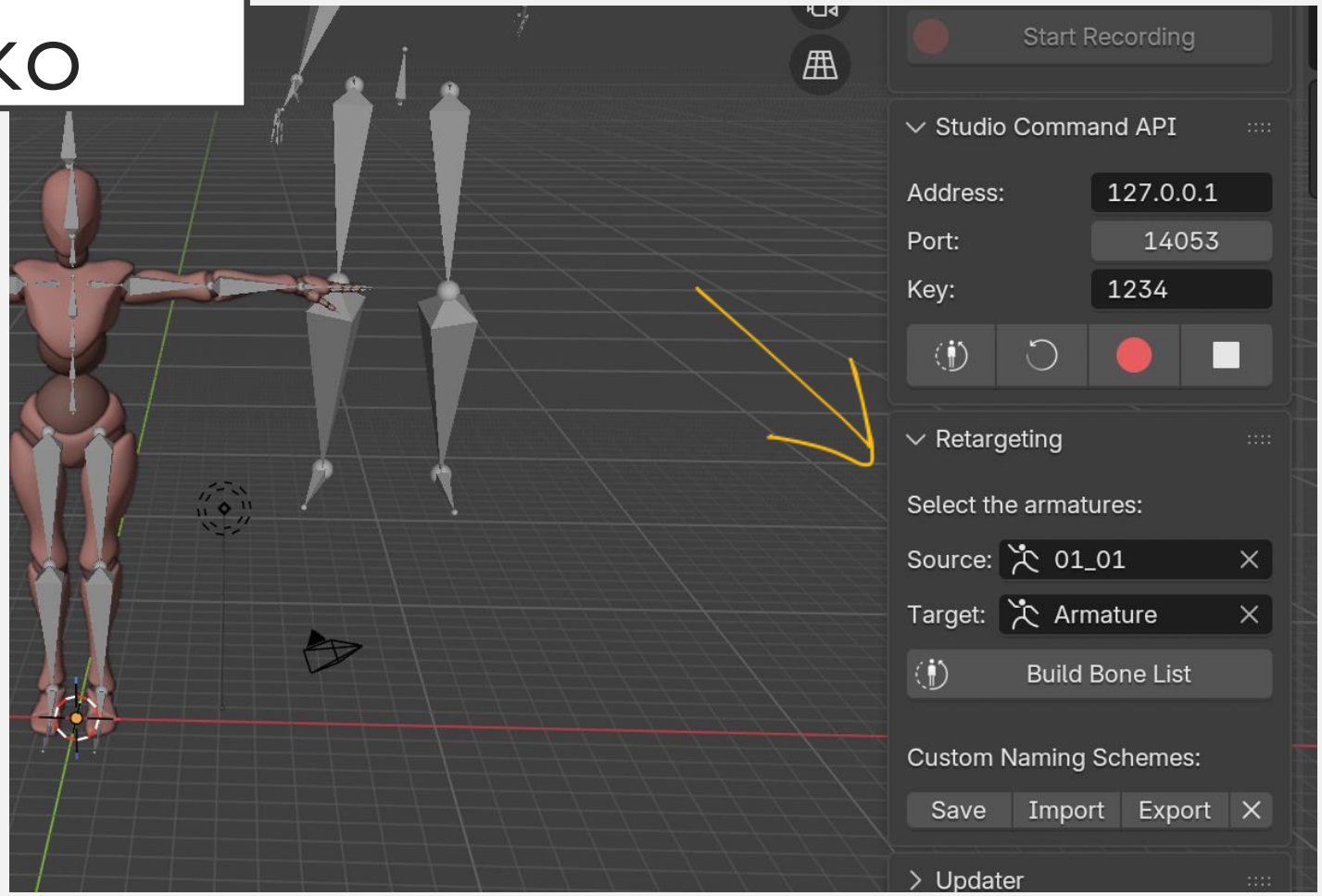
RETARGET IN ROKOKO

Push [N] to open the Rokoko panel

And click on Retarget to open the menu, and fill:

1. Source → The BVH animation
2. Target → Our character
3. Push on Build bone List

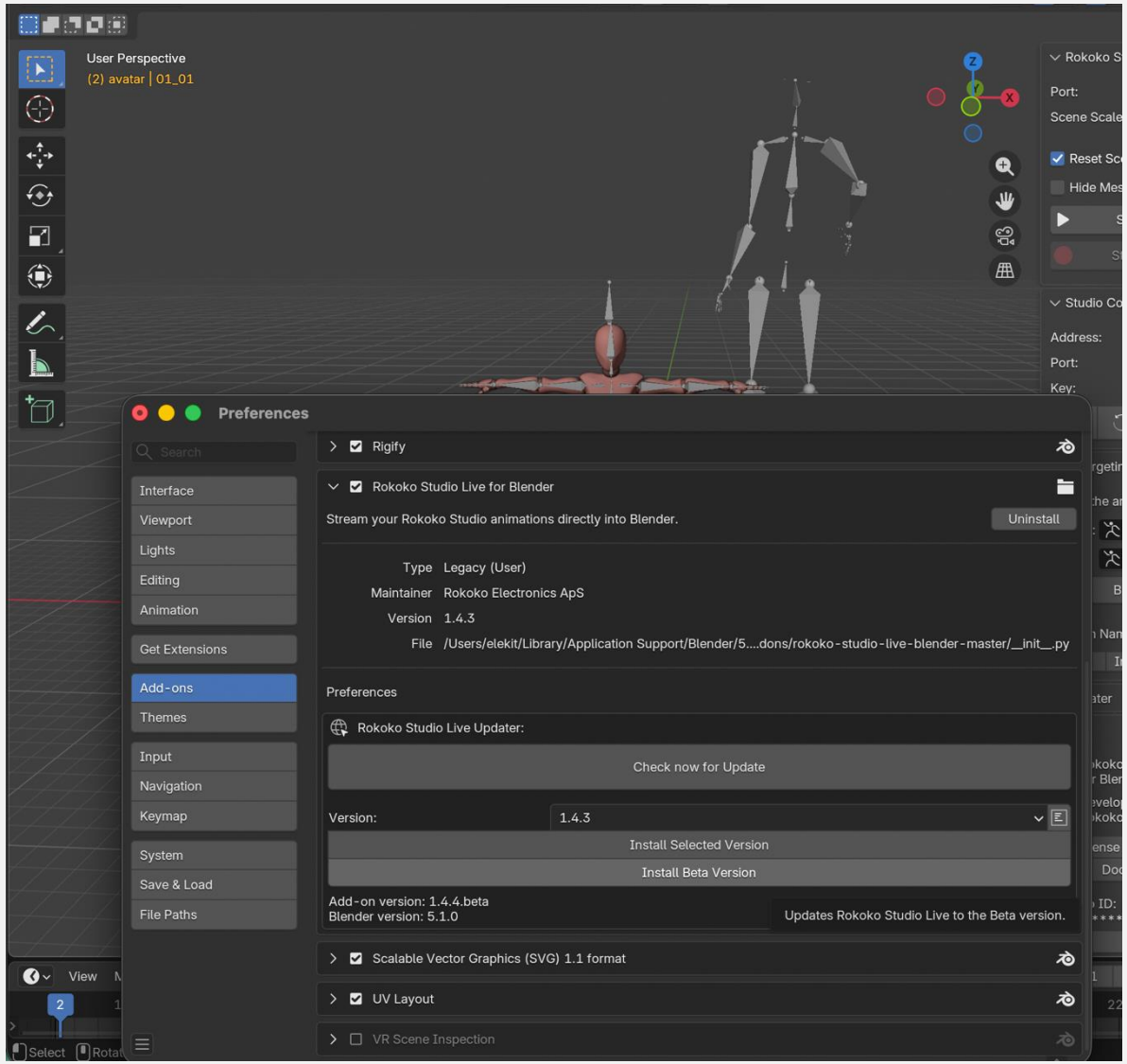
A Python error may occur in Blender 5.x → see next slide



Troubleshooting

If a Python error occurs (then you are using Blender 5.x) then go back to Edit > Preferences > Rokoko plugin and Install the Beta version

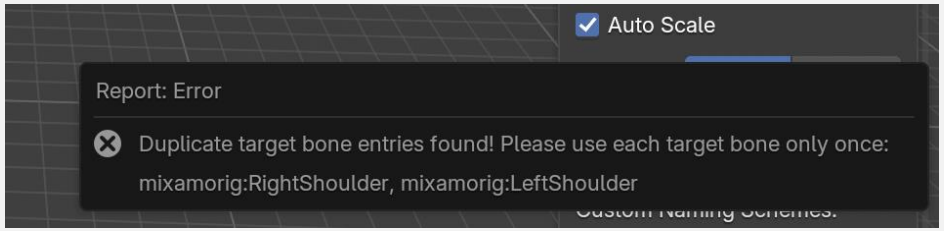
Then Save, Restart Blender and try again the steps in the previous slide “RETARGET IN ROKOKO”



RETARGET IN ROKOKO

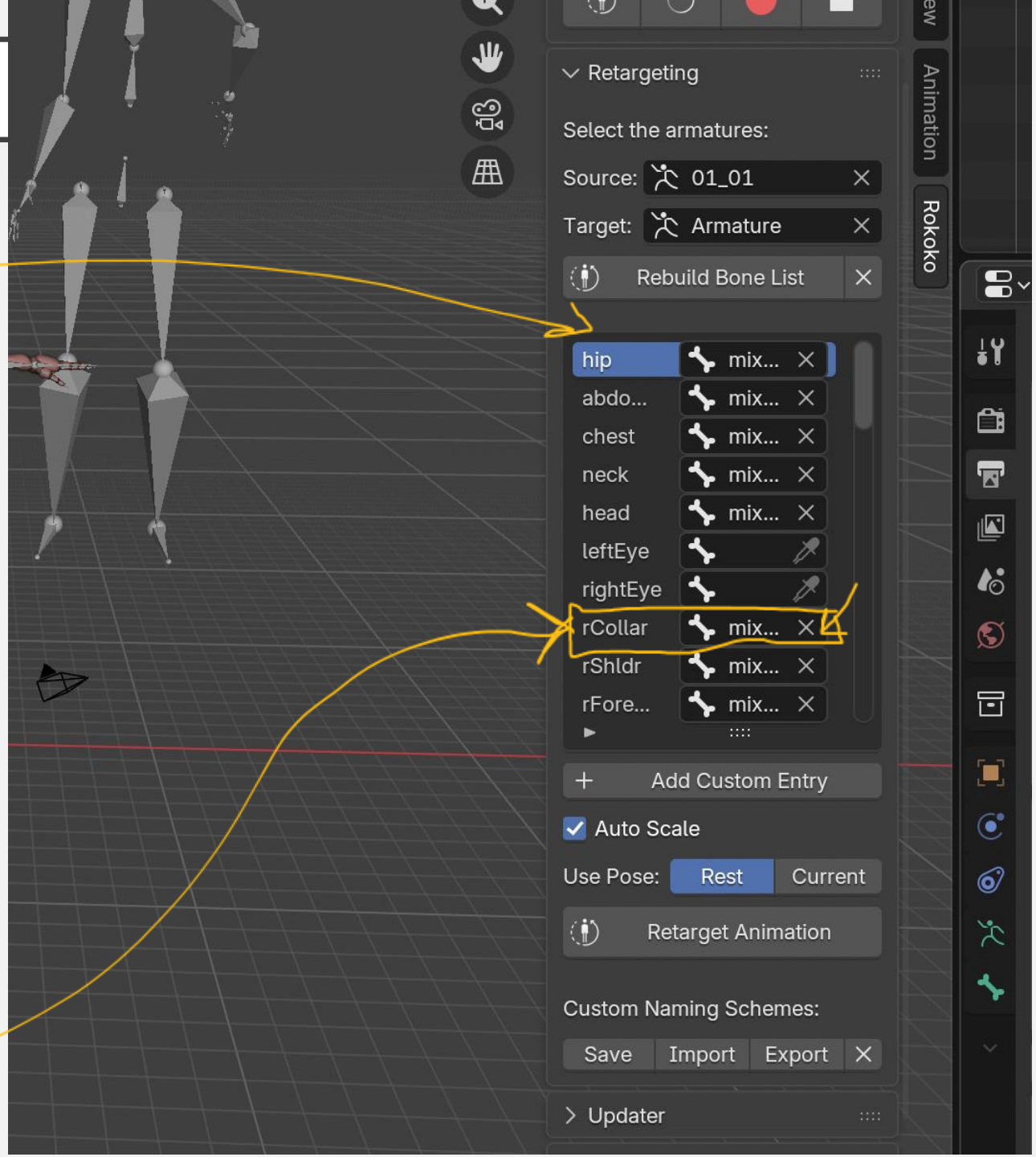
Upon success a list of bones appear.

Then you can push on Retarget Animation, but a Report:Error may appear:



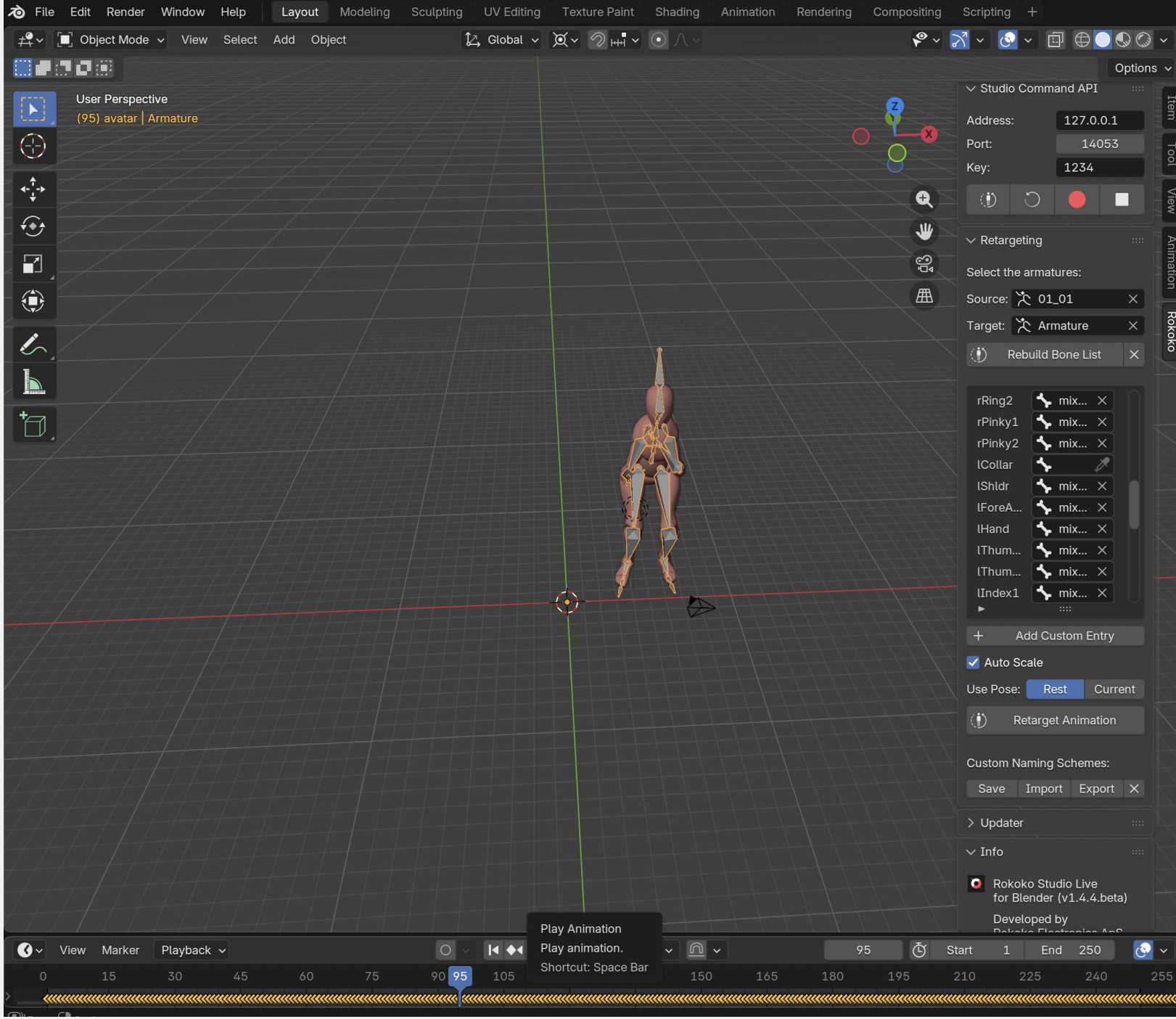
Then manually update the list of bones to respect the Report: Error

In my example I should remove from the bones list the RightShoulder from rcollar by clicking on the x (and repeat the same for the LeftShoulder)



Animation Done!

After Retarget animation you can click on our character and play the animation with [space bar] key or manually from the Animation

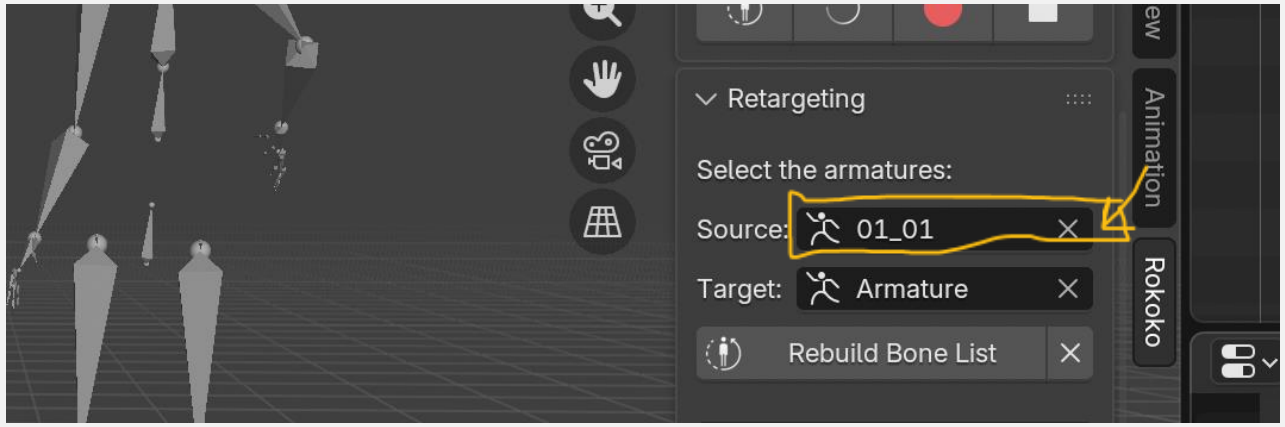


Progettino - Compito per Casa

RETARGET IN ROKOKO

Dal Progetto fatto in laboratorio rimuovere 01_01 dal pannello Rokoko

Scegliere un’altra animazione (ad esempio 02_01) e ripetere la procedura vista in laboratorio e che riporto qui di seguito nelle slides successive



IMPORT BVH – MOTION CAPTURE DATA

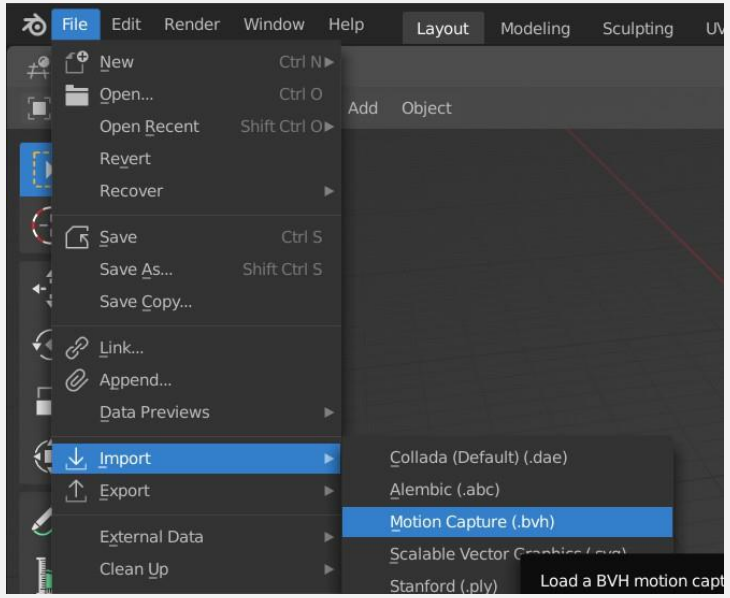
Unzip the folder with .bvh files

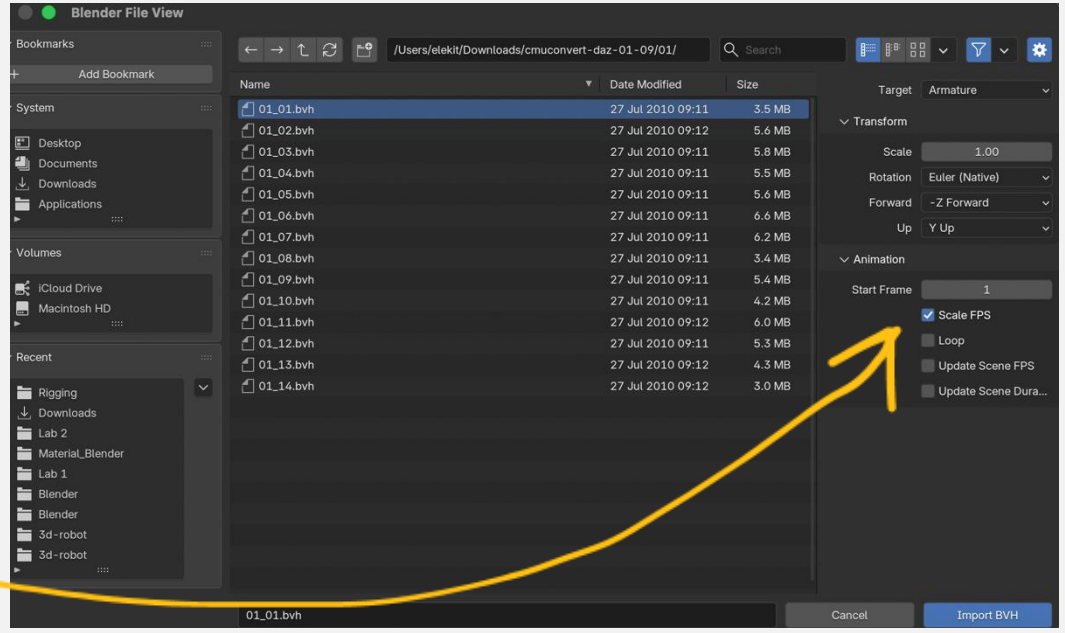
1. Create a new Blender file, open the top menu on the left, select Files > Import > Motion Capture (.bvh)

2. Navigate to bvh_files and select the file 02_02

3. Check **Scale FPS** to adjust the animation to the frame rate of our scene, and confirm

(you can check the fps of the scene in the Output panel)





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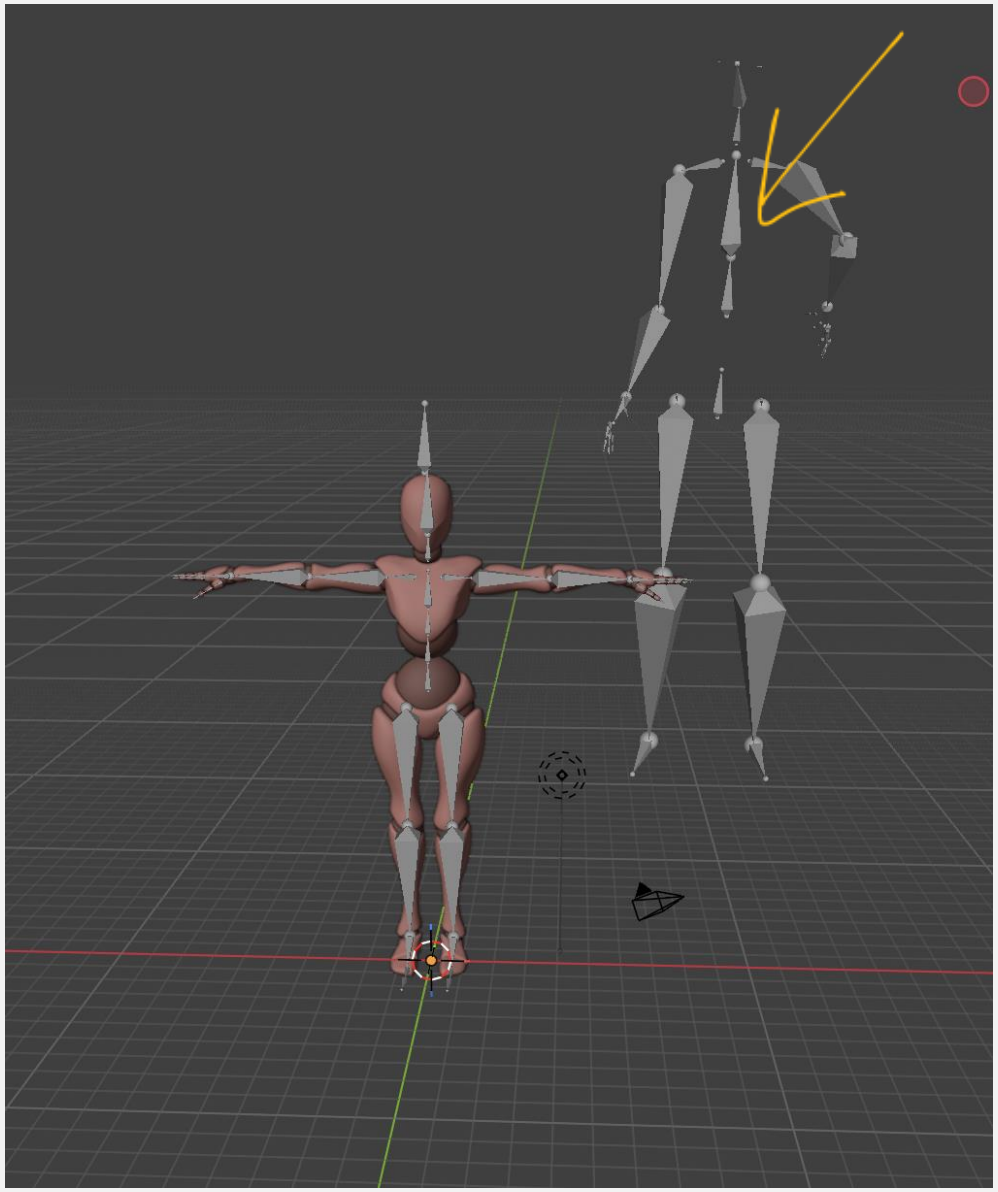

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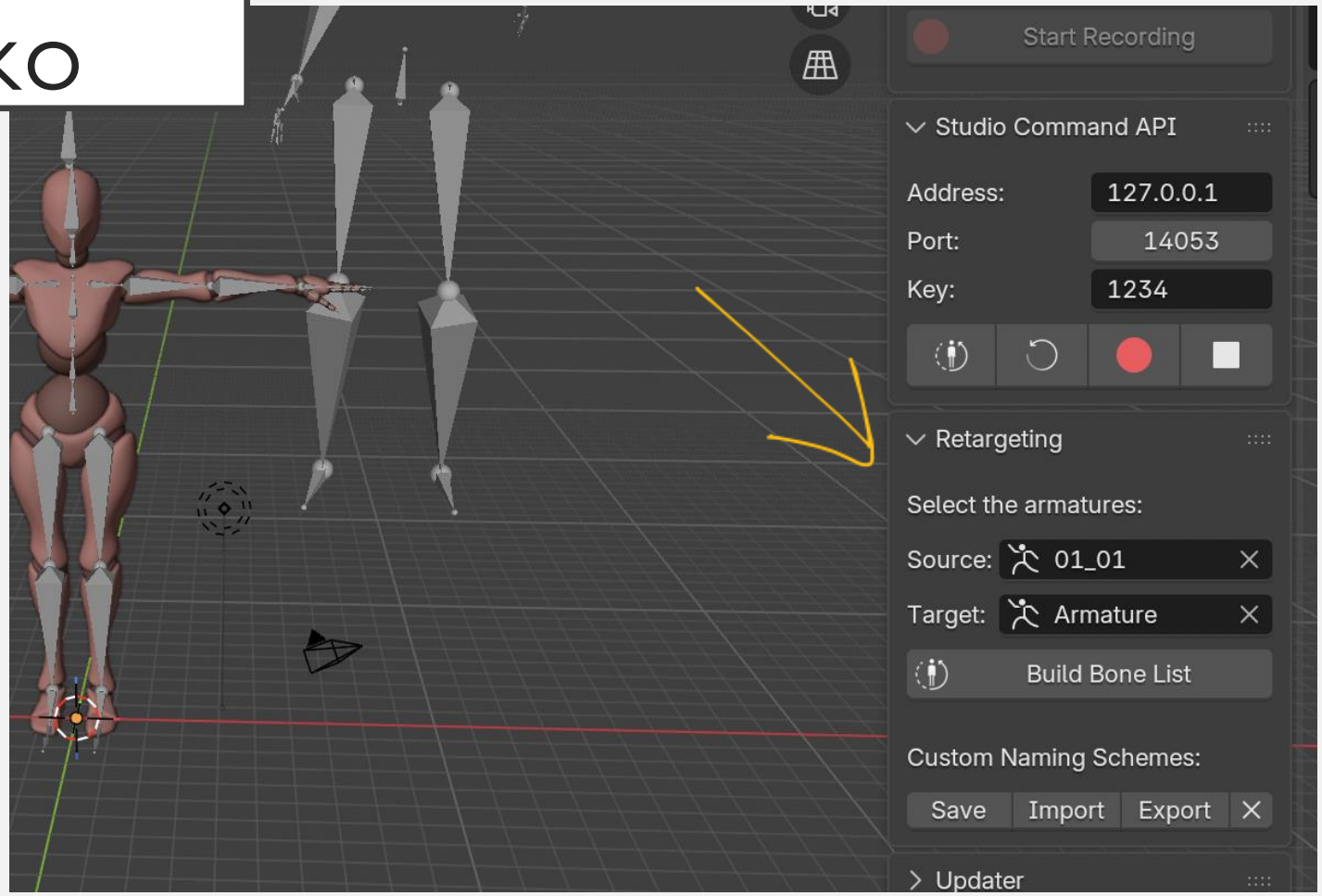

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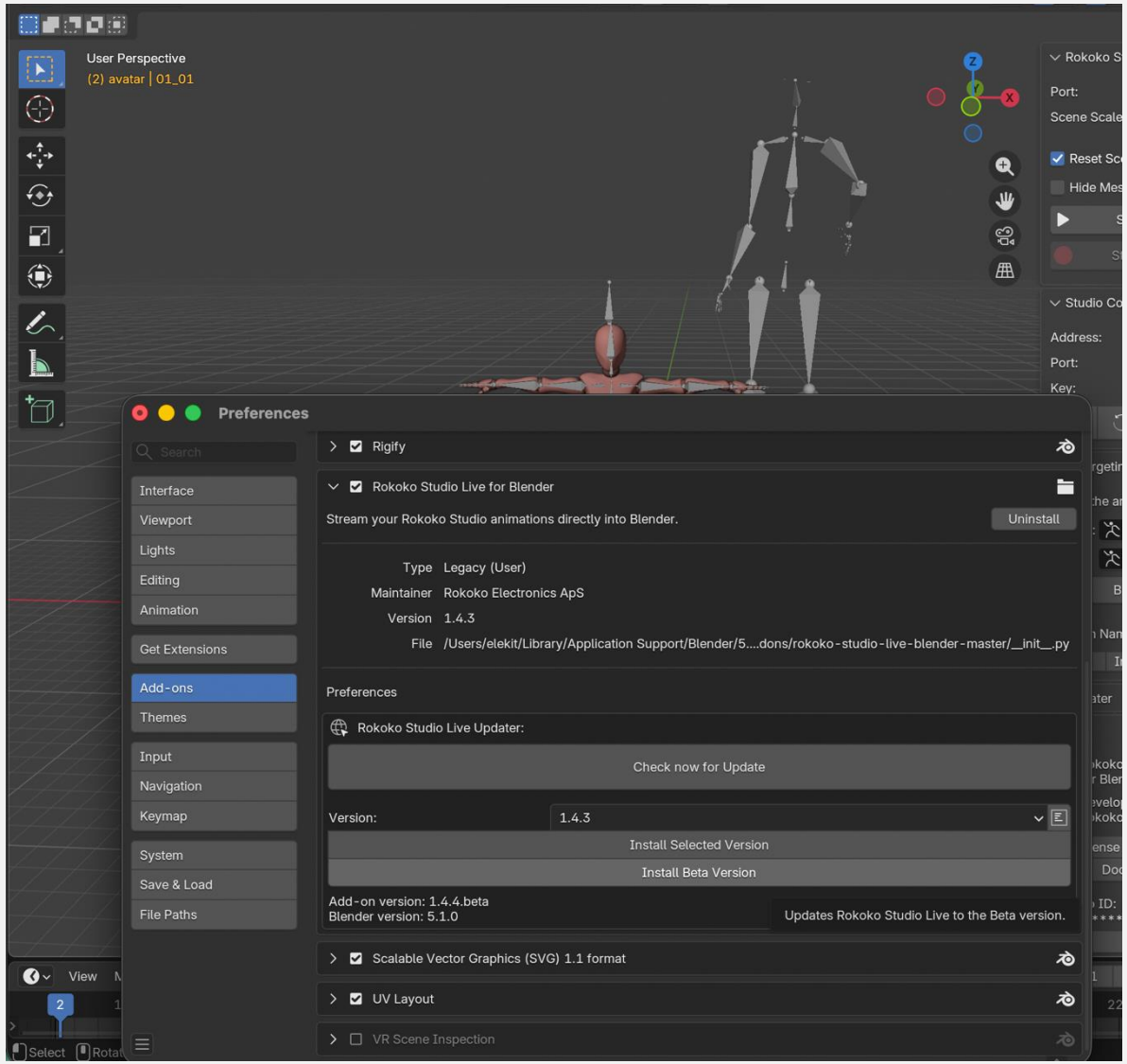

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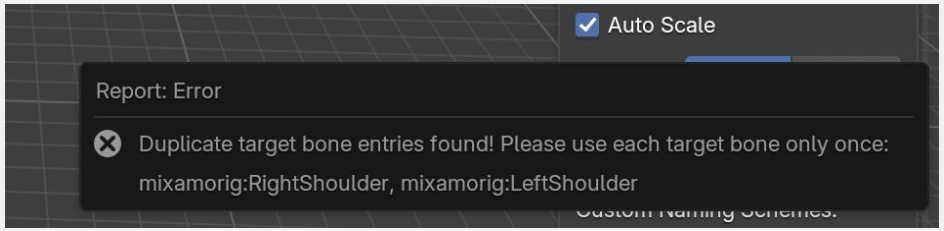

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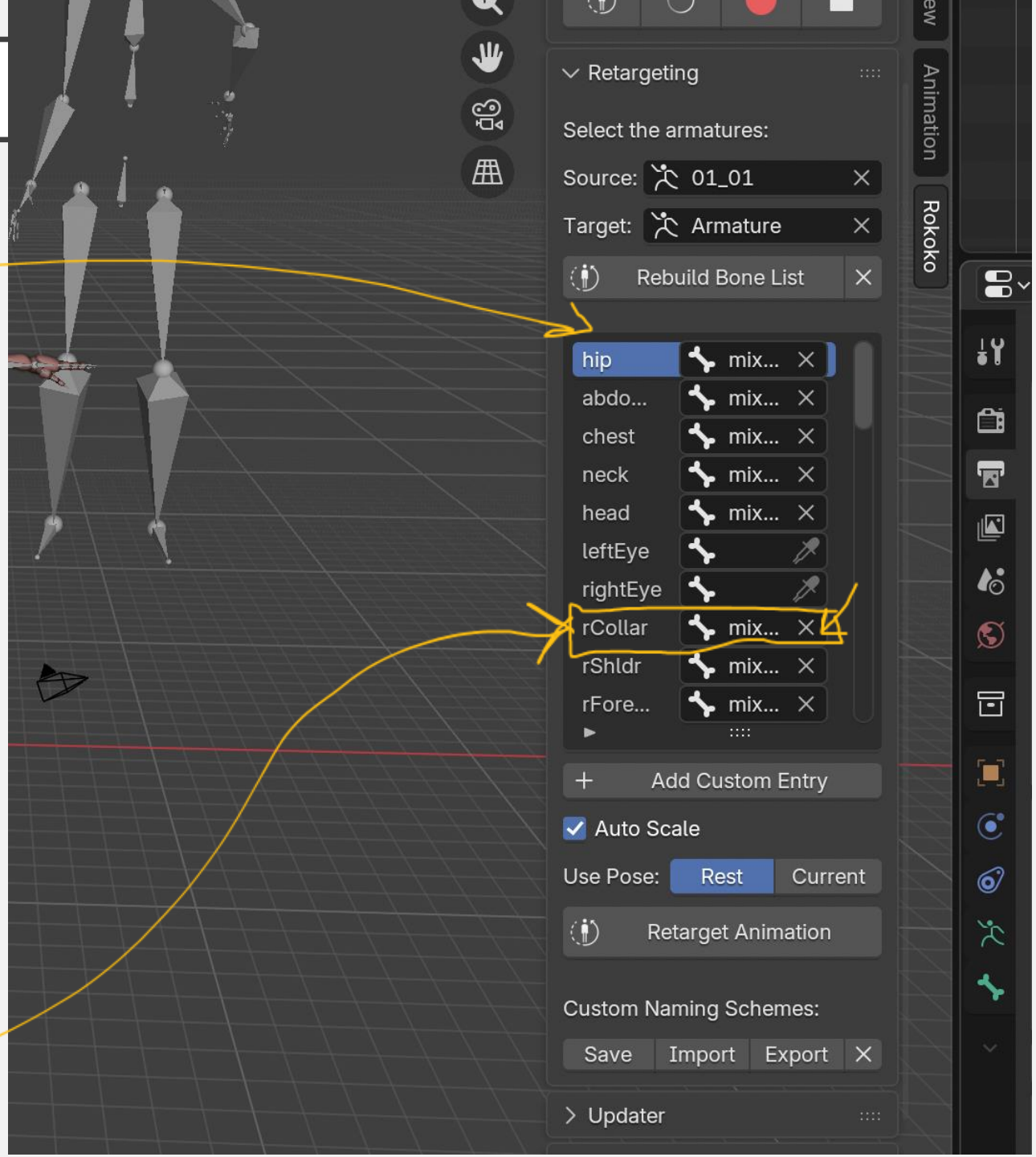

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