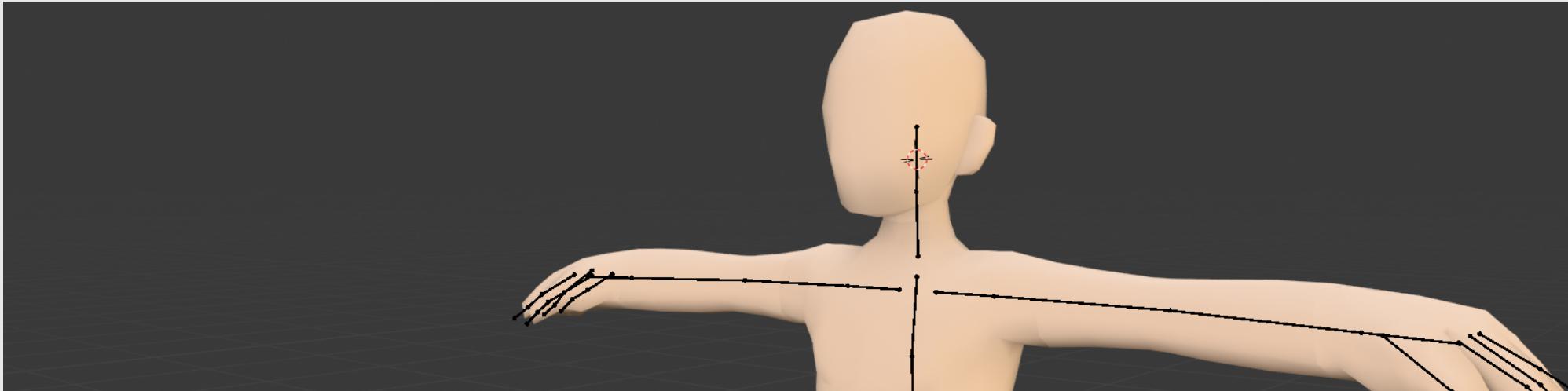


# SS3D Rig Format Guide



## Info

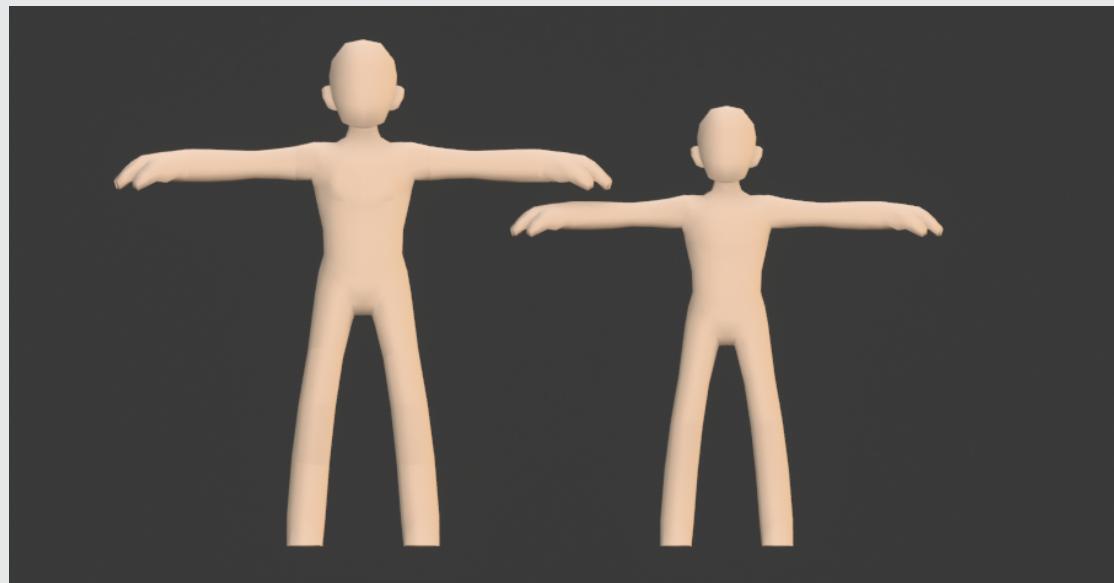
This guide is written with the intent to inform Space Station 3D contributors about the correct rigging process for SS3D, assuming the reader knows the basics of rigging a 3D model. As such, this guide does not cover the process of rigging, but instead, the format of rigs in SS3D, and how you can cleanly get custom clothes and hair models workable in-game. **It is recommended you read through and follow this guide in its entirety** before you consider your model complete.

# In-Game Scaling

## Detail

To match assets created before the human model was finalized, **the rigged human model is scaled down .87 in-game.** This creates a size discrepancy with a majority of items in the game. Because the rigged model is scaled down automatically in Unity, the size discrepancy is also negated automatically. **Do not adjust the scale of the rigged model.**

The dummy model included in the SS3D Modeler's Kit is the in-game size, while the rigging size is the size you should be working in for rigged items.



Rigging size (left) vs in-game size (right).

# What Needs Rigged

## Detail

Some objects don't need to be rigged, and can just be parented to the bones in-game. Below I will detail which items need to be rigged to the character armature, and which items do not.

- **Needs Rigged to Character:**

- Hair
- Jumpsuits
- Overcoats
- Underwear
- Backpacks
- Gloves
- Shoes
- Belts



A welding mask doesn't need to deform, and therefore doesn't need to be rigged.

- **No Rigging Required:**

- Hats
- Helmets
- Masks
- Glasses



Examples of items that need rigged to the character.

# Equipped and Held Items

## Detail

While the rigged model is useful for being worn, it is not very useful as a held or dropped item. For this purpose, **we need two models for a given piece of equipment** (with the exception of head-mounted items). One for being worn on the character, and as an item to be held in the hand. Head-worn items generally do not deform like most clothes do, so it is unnecessary to make separate rigged and item-versions of these articles.

If for some reason you need your head-worn item to deform, then you will likely need a separate held item for it as well.



Items like headwear generally look fine without needing a held item version.



The equipped item vs. the held item.

# Body Clipping

## Detail

When weighting clothes to the armature of a character, it's often very difficult to ensure that it deforms 100% consistently with the body underneath, resulting in parts of the body clipping through the clothing. To circumvent this, we hide portions of the body beneath the clothes, so clipping isn't an issue. To make use of this, **it is recommended that you model the ends of the clothes along specific cutting lines**, such as at the wrist and below the shoulder for tops, and directly above the knee and below the ankles for bottoms.

We can also make use of an alternate body mesh that reveals only the area surrounding the neck, so shirts can have some leeway on the size of the collar.

When modeling the ends of the clothes, it's also best if you model inside the ends of sleeves, so if the limb is severed, it will still look natural.

Hiding invisible parts of the body can prevent excessive clipping.



Sometimes, clothes deform inconsistently with the body.



# Body Shape Keys

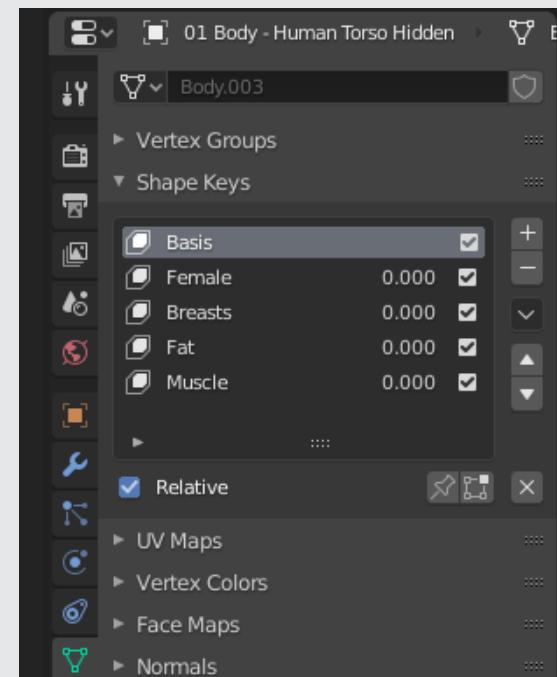
## Detail

A shape key (also referred to as "*blend shapes*") is a basic mesh transformation that moves vertices directly from point-A to point-B. These can be used for a variety of functions, but in this context, we use them to customize the proportions of player-created characters. Accordingly, the rigged clothes need to be able to support the shape of the body underneath, so clothing items also need to contain the same shape keys.

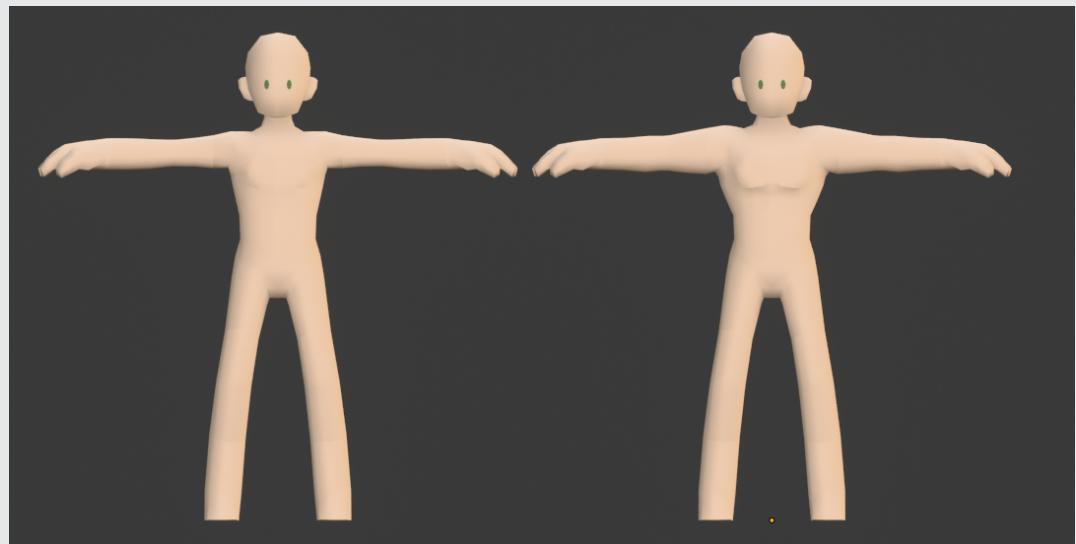
**The shape keys that need to be accounted are as follows, and need to be named exactly the same way:**

- **Basis**  
The default character shape.
- **Female**  
The female variant of the base character.
- **Breasts**  
Size of the bust.
- **Fat**  
Chubbiness.
- **Muscle**  
The size of the character's muscles.

Location of shape keys in Blender.



Basis vs. Muscle keys. (Below)



# Hair Shape Keys

## Detail

While body shape keys are used for customization, hair shape keys are used to maintain the look of the character while also allowing hats, helmets, masks, and hoods to be worn on top. For this, we shrink the effected part of the hair so it fits within the constraints of the hat. For this, I've created a couple shape keys that should fit the constraints of a large majority of hats.

**The shape keys that need to be accounted are as follows, and need to be named exactly the same way:**

- **Hat**  
Squishes the top of the hair down as if there were a hat on top.
- **Helmet**  
Squishes all sides of the hair inward toward the head aside from the bangs. Used primarily in instances where the helmet might reveal a lot of the head.
- **Mask**  
Squishes the bangs inward as if a mask were pressed against the face
- **Hood**  
Like the *Helmet* shape key, but more extreme.



Hair without "Hat" shape key.



Hair with "Hat" shape key.

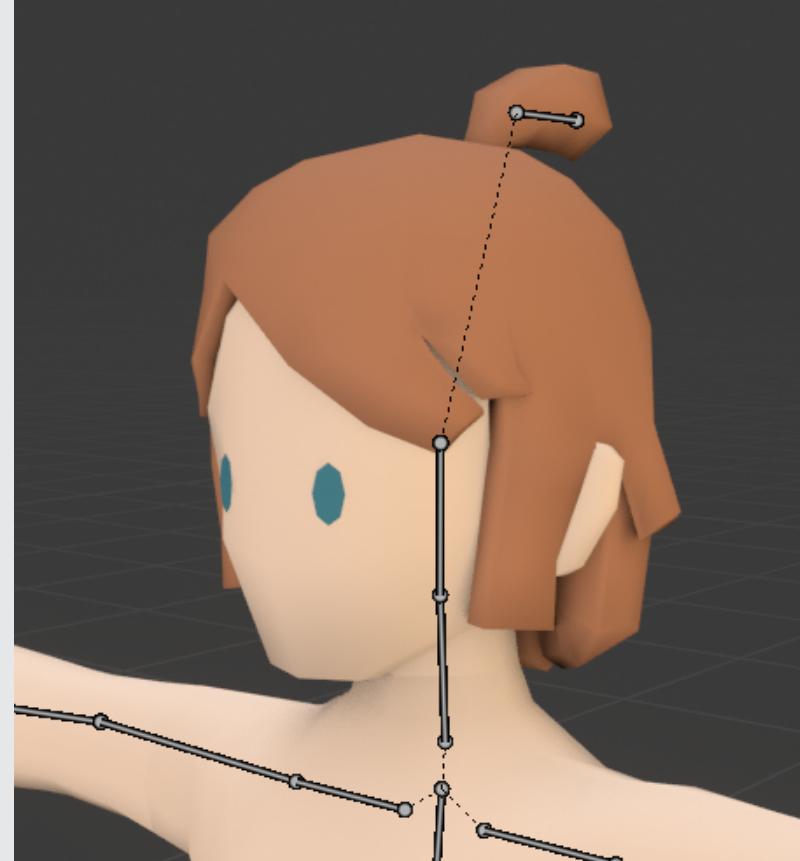
# Dynamic Bones

## Detail

Simply put, dynamic bones work pretty much the same as regular bones, but they are made dynamic in Unity. You will add bones to the rig up the subject the same as normal, applying weights where you would normally.

Something to keep in mind when rigging up hair or other equipment with dynamic bones would be to ensure that the shape keys don't ruin the effect of the weighting.

Additionally, especially long hair might need an alternate hair model with shorter hair to fit within the confines of a closed helmet, and things like ponytails can be made into separate objects so they can easily be hidden when a helmet is put on.



Remember to parent the dynamic bones to the correct location. In the case of dynamic hair, parent the additional bones to the head bone.

# Origin Placement

## Detail

Object origins hold a lot of vital information, such as an object's scale, rotation, and position. You'll want to apply the scale, and rotation of the object, or it will likely be horribly disfigured after export. **To apply scale and rotation in blender, select the object and press CTRL+A in Object Mode**, and select the respective options in the menu.

If the object is rigged to the body, the origin of the object should be in the exact location of the body's origin. As for hats and other non-rigged head-worn items, the origin should be placed in the middle of the head bone.

If you are using the human rigging template in the *SS3D Modeler's Kit*, you can use the included objects as reference for where the origin should go.

Placement of origin for a head-mounted object.



Placement of origin for a rigged object.

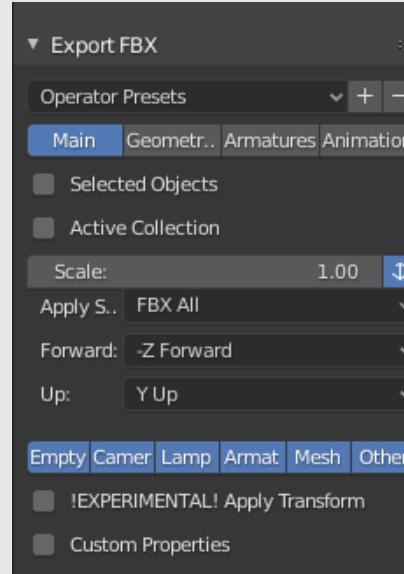
# Exporting Items

## Detail

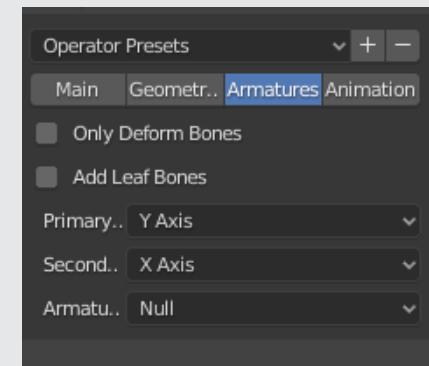
When exporting a rigged item, you need to export the model itself as well as the armature you used. If the rigged item requires a secondary held item, it should be included in the same .FBX file as the rigged model and the armature.

As always, if you are exporting items from a file with multiple objects, be sure to select only the objects you want to export and turn on "Selected Objects" in the export settings.

Included on this page are the ideal export settings.



Toggle "Selected Objects" if you are attempting to export multiple objects.



In the Armatures tab, "Add Leaf Bones" is active by default.

Be sure to turn that off.