



The Jiggle Deformer

for CARRARA 5 & 6

BETA Version 0.53

The Jiggle Deformer fakes the simulation of soft flesh dynamics. Bellys, breasts, guts and butts can be made to automatically droop with gravity and jiggle when the figure moves. It works on figures with or without conforming costumes. Figures and scenes imported with the Transposer cannot be used with the Jiggle Deformer and must use the Native Importer.

To install the plugin extract the contents of the compressed zip package into the ..\Carrara\Extensions sub-folder. Optionally extract the files into a convenient ..\Extensions\Sparrowhawk3D folder. The plugin must also be installed into the ..\Extensions folder of all render nodes. To remove the Jiggle Deformer Carrara 5 and 6 users must delete the Jiggle.mcx, Jiggle.dat and Jiggle.txt files.

Macintosh users should open the Carrara installation folder (typically /Applications/Carrara). Right-click on the Carrara or Carrara Pro application and then choose "Show Package Content". Navigate to "Contents/MacOS/Extensions" then copy the Jiggle.mcx, Jiggle.dat and Jiggle.txt files into that folder.

Once installed, apply the Jiggle deformer by first selecting the skin or geometry of the figure, that is not the bones or parent group. Open out the Properties tray and then on the Modifiers card hit the + icon and choose Jiggle from the list of modifiers. If other Sparrowhawk3D modifiers are installed it can be found under the submenu.

Notes Regarding the Beta Version

The Jiggle Deformer has been alpha tested with several animals and human figures in Carrara 5 and 6. There have been some crashes and memory increases noted but these appear to be problems with using Poser figures in Carrara. Use rotating saves (change the file name) and save the file before rendering and after setting up the deformer. Carrara 5 and 6 will flag errors if skinned figures and costumes are deleted but not cleared from the list of master objects. Always select Edit | Remove Unused Master Objects, also Shaders after deleting a figure.

Do not drag and drop the Jiggle Deformer onto another object or try and copy it. Always add a new empty deformer to each mesh.

Version 0.3 adds a popup selection dialog to choose the mass target and zone. Files saved with v0.2 should load with no problems but only the names will appear on the button - you must go into each instance of the Deformer and re-select the objects using the dialog.

Version 0.3 adds a feature to save the weights, when this is done the figure can be freely posed in the first frame. It speeds up posing in the first frame and the list of weighted vertices are saved with the scene file.

Version 0.4 adds additional realism by maintaining the volume of the mass when its pushed into or pulled out away from an underlying bone.

Version 0.41 adds an Animation Effect % slider to exaggerate or reduce the jiggling beyond the stretch limits.

Version 0.5 added collisions but these have been fully disabled cause they didnt work properly.

Version 0.52 adds tabs to tidy up the user interface and change of mesh vertex checks.

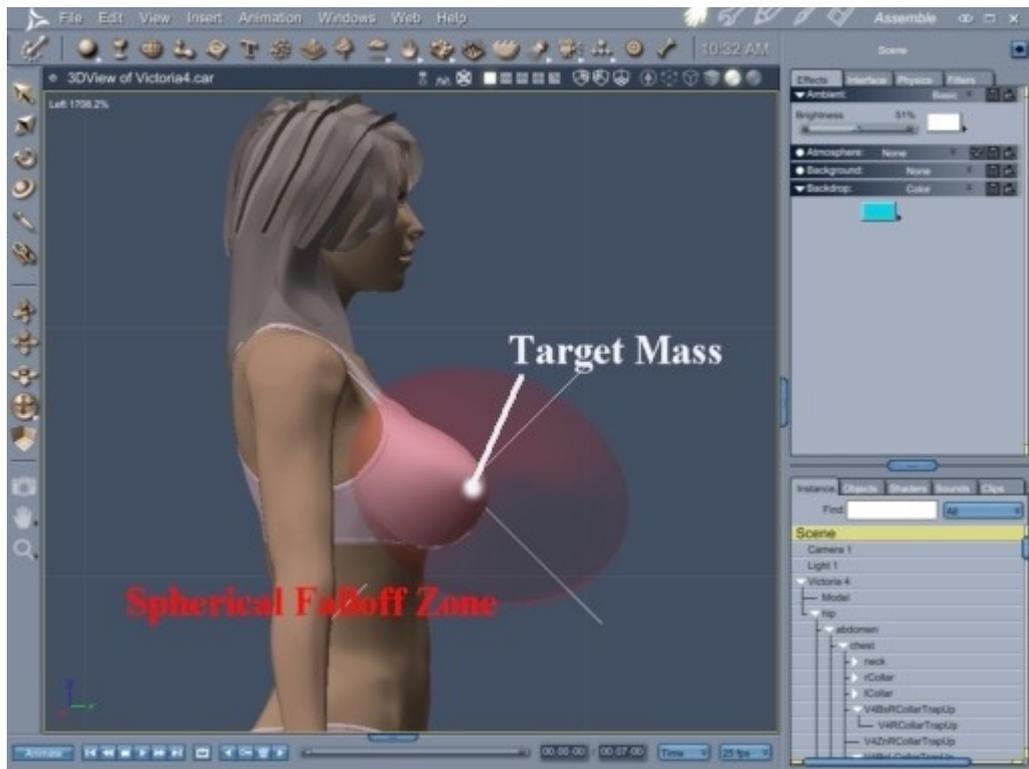
Use caution when working with vertex and spline objects, if any vertices are added or deleted, if subdivision is changed it will crash !

Files saved with earlier Beta versions may not work immediately with newer releases. The Target Mass and Inclusion Zone may need to be reselected or the Store Vertex Weights box must be checked and unchecked when progress is set to 0% and the inclusion zone encloses the mass.

Using the Jiggle Deformer

Add the human figure or animal into the scene and any conforming clothing. Set any figure morphs first but turn off any morphs that apply weight or droop to the figure as this will be simulated with the Jiggle Deformer. Keep the figure in their 'reference position' during the process of setting up the Jiggle deformer for the best results. *Check any figure with a conforming costume over and make sure there are no poke throughs before applying the Jiggle Deformer.*

Best results are obtained by painting weight maps for the figure and any clothing. The Jiggle Deformer can use the weight map to determine which vertices of the figure are soft flesh and how much they stretch. Areas of the map painted black will not move, brightest white will move fully and any shades in between are used as a simple multiplier. So long as the figure is made with unique uv texture co-ordinates for each vertex the weight map gives precise control. Texture templates can be downloaded for most figures from the content source website. Many figures use multiple texture maps for their body, head, eyes etc in which case inclusion zones can be used with the Jiggle Deformer to isolate specific parts of the body. Weight maps are best painted using an application capable of importing 3D geometry and painting them directly onto the figure and costumes for immediately visible results. A smoothing or blurring filter should be applied to the weight map to avoid getting crinkles at the edges and hard edge shadows when the jigglig flesh is rendered.



The Jiggle Deformer needs to have a selected 'target mass' in order to work, for this simply use a target helper object. This mass should be positioned in the middle of the soft flesh and parented to the underlying bone. For example position a target helper between a figure's breasts then drag and drop it onto the chest bone in the hierarchy. As the figure moves the deformer tracks the motion of the hot point of the target mass and treats it as though it were a weight on the end of a piece of elastic. The figure and any conforming costume will share the same target mass. The bone itself should not be used as the target mass because any rotation it makes will not be detected (the hot point is the centre of rotation and doesn't move). Freely adjust the size of the target helper object for visual preference or hide it in the scene once in place, its size has no effect on the mass. Placing the target mass further away from the centre of the soft flesh will exaggerate the jiggle effect.

In nearly all cases an inclusion zone is needed or it can be used instead of a weight map. There is no special 'zone' object so use a Sphere primitive. Drag and drop a sphere into the scene then edit its shader. Set the colour to bright green or red and then add a 15% value shader to the alpha channel. When the 3D view in the assemble room is set to show transparency this will make it easy to adjust the zone. Using the top and side views scale the zone and position it so that it fully encloses and intersects with the part of the figure that will jiggle. Try to place the zone so that it is centred in the middle of the mass if the zone falloff will be used rather than the weight map. The zone can be rotated and scaled in any axis to better fit the figure. When the zone is in position uncheck the visible property so that it is not rendered. Make it visible again if any adjustment is required. The zone must also be parented to the underlying bone of the figure however it is only used during the first frame to find and weight the vertices, unless they are stored (see below).

Select the mesh of the figure, typically named 'Model', then add a Jiggle deformer. Hit the button and in the dialog box select the target mass from the scene list. When a target mass is found then the Jiggle deformer will become active and the whole figure will drop down in the scene until a weight map or zone are selected. Use the standard texture map UI to load up the

weight map in the <Weight> tab. Switch to the <Zone> tab then hit the button to select the zone if the figure requires a zone. Check the *Use Zone Falloff* option when using the zone on its own or when using conforming costumes for best results. Adjust the falloff setting to change the how the weight value is multiplied at the edges of the zone, without a falloff the edges of the soft flesh would fold.

The default parameters to control the jiggle effect have been set for a standard DAZ/Poser figure imported into the scene. If the scene units have not been set appropriately then the values will be difficult to adjust and read. Carrara 6 users can select the Scene and then on the <Interface> card adjust the *Displayed Unit* to 'in'. Carrara 5 users should use the top menu and choose File | Preferences then under the General Scene Settings category change the *3D Units* to 'in'.

Checking the *Black Threshold* box in the <Weight> tab will turn off the variable weighting applied to the figure, any black vertices will never jiggle but all other shades are treated as being fully weighted. Normally the zone falloff and painted weight values are multiplied if both are enabled.

Select the geometry of any conforming costumes and apply another Jiggle deformer to each piece affected. Do not drag and drop the Jiggle deformer from one object onto another. The same target mass and zone for the costume and the flesh beneath should be selected. Load a different weight map for the costume. All of the parameters set for the Jiggle deformer on the figure must be exactly the same as those used on the target mass. Since it can be difficult to paint the weights exactly the same on the costume as the figure then the falloff zone is best used to prevent any poke through effects.

Storing the Vertex Weights

A figure should always be set up in their 'zeroed' or 'reference' position and with any morphs and magnet deformers applied. The Jiggle Deformer relies on reading in the grayscale value from the weight maps and/or zones. If other parts of the figure which share the same uv space are in the inclusion zone during the first frame then the flesh on those parts will also jiggle. For example the Victoria 4 figure's right arm and shoulder overlap with her breasts. Furthermore if the Jiggle Deformer is applied to a figure's buttocks and they need to be walking or sitting in the first frame then the vertices stretched and moved by the bones will get an irregular or inconsistent falloff value. By saving the weights in the reference position these problems can be avoided. All of the vertex weight values are saved with the scene file and can be changed later at any time.

When the figure and any costumes have been setup and tested with the Jiggle Deformer (most easily done by changing the *Weight* to a larger positive or negative value) then check the *Store Vertex Weights* box. Now the zone and weight map are no longer used to build the list of weighted vertices when the *Progress* slider is at 0%. When the file is saved the weighted vertices are saved with it. The figure can be freely posed at start time.

To change the stored weight values adjust the zone, falloff parameters or reload the weight map then uncheck the *Store Vertex Weights* box. Recheck the box again to store the changes.

Setting the Jiggle Parameters

The Jiggle Deformer fakes the simulation of soft flesh. When the figure is moved around in the scene inertia is applied to the target mass as though it were on a piece of elastic. The elastic will stretch but gravity and its own resistance to stretching will pull it back into shape. Depending on how the parameters are set and how quickly a figure moves the target mass will lag behind until it reaches the limit of the elastic and then snap back. Inertia will keep the mass moving past the resting position until the dampening friction and resistance in the elastic and gravity bring it to rest.

Most of the values are in scene units so if the figure is scaled after setting them they must be adjusted accordingly. Exactly the same values must be set for any conforming costumes.

The most important parameter to set correctly is the *Progress* value. The Jiggle Deformer will only animate when this value changes over time. The Progress value must be set to 0% at the first frame as this is used to determine which vertices have a non-zero weight. Move the time scrubber forward to the end of the animation then set the Progress to 100% in all instances of the Jiggle Deformer. If the animation start or end time are changed then make sure the Progress value is reset.

The *Weight* value is entered in scene units for the unscaled figure. This determines how much the soft flesh will droop or hang with gravity when the figure is at rest. For a loose or saggy fleshy mass use a higher weight value.

The *Stretch* value is also entered in scene units for the unscaled figure. The larger the stretch value the more the flesh will be allowed to stretch or bounce as the figure moves. Typically the Stretch will be either half or a little higher than the value of the Weight. Play around with the Weight value, using larger positive and negative values to get a good idea of how far the flesh should be allowed to move and how to set the Stretch.

The *Taughtness* value is entered in scene units for the unscaled figure. This sets the strength of the elastic and how forcefully and quickly the mass will be pulled toward its resting position. Set the Taughtness to half the Stretch value for best results. Setting too low a taughtness will cause the jiggling flesh to float slowly and setting too high a taughtness value will make the flesh snap back rather than jiggling.

The *Taughtness Falloff* controls the strength of the elastic. A value of 1 gives a linear response so the taughtness has equal strength no matter how far the mass is from its rest position. Setting too low a falloff will cause the flesh to jitter and prevent it from coming fully to rest. Setting too high a taughtness falloff will cause the flesh to float rather than jiggle back and forth.

Dampening is used to adjust for how long the flesh will jiggle. This value is frame rather than time based so the dampening is applied to the current velocity of the mass every frame during the animation. Using a very low dampening value will cause the flesh to jiggle indefinitely and a very high value will get no jiggle at all.

Adjust the *Animation Effect* percentage to exaggerate the jiggling. Setting a value of 200% will double the displacement size of the jiggling flesh, setting a value of 50% will half it. This multiplier has no effect on gravity or the speed of the jiggle.

Now move the figure around, apply animation poses, make them jump up and down, dance, strut it or shake it. The only limitation is that the weighting of the vertices is only recorded when the *Progress* slider is set to 0 and if a weight map is not used and other parts of a figure's body or costume enter into the zone at time 0 then they will also jiggle.

Freely move the figure around by their hip or move the parent group around in the scene but do not rotate the parent group. The Jiggle deformer uses the orientation of the figure to work out which way is down for gravity. The figure's hip can be tracked to a seat in a vehicle but do not place the parent group into a vehicle. *The final version may be able to address this issue or include a fix.*

The Jiggle Deformer is pretty fast even with many applied instances. However when the progress value is at 0 which should be at time 0 then every vertex of the figure is processed when any changes are made. To test most of the settings use the time scrubber or hit play it in the scene preview to check the degree of bounce and jiggle. Even while posing a figure the Jiggle Deformer will be active. Set the figure to display only bones or bounding boxes for faster posing, this also disables the deformer in the scene preview. Only the Progress value is key framed so parameters can be adjusted at any time and their values will be constant throughout.

Maintaining the Volume

This feature is recommended for more experienced users.

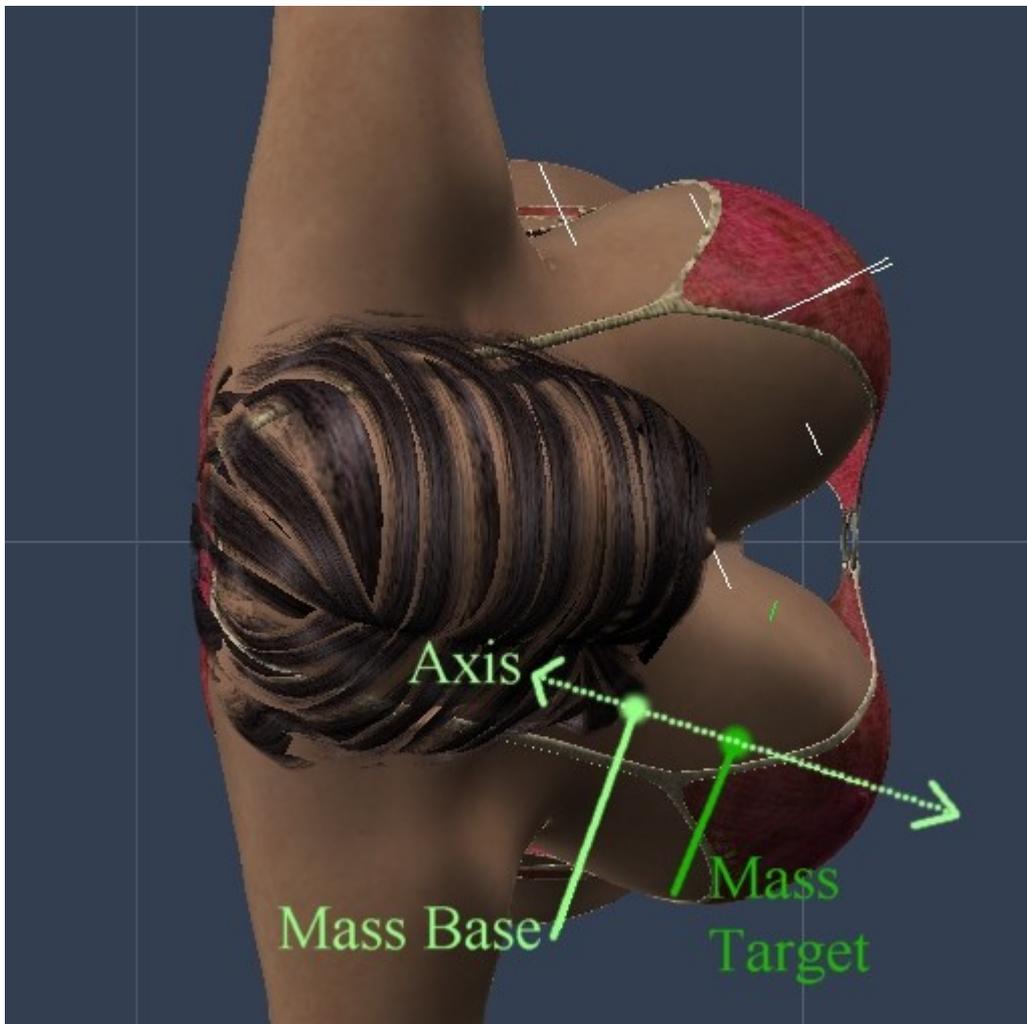
When a soft fleshy mass is pushed in upon itself, under its own weight, or by the motion of the figure, then that mass will flatten out against and over the underlying bones. Similarly when a fleshy mass sags or droops it will be stretched. The Jiggle Deformer can try to maintain the volume of the fleshy mass. The alignment of the mass target to its parent object is used like a surface normal so that the deformer can tell when the mass is being pushed into or pulled away from the underlying skeleton of the figure. For example when a woman is lying down her breasts should spread out over her ribcage or for someone with a fat stomach this should flatten out over their abdomen.

To better understand how to configure the settings and how this feature works consider a cube of dough of dimensions 1 x 1 x 1. If we were to press down on the dough so that it was now half its height then in order to maintain its volume of 1 the dough's dimensions will now need to be 1.4 x 1.4 x 0.5 evenly spread out to the sides. Similarly if we pinch the dough and stretch it up to twice its original height then its dimensions must be about 0.7 x 0.7 x 2. If we were to continue to flatten out the dough with a rolling pin it will spread out over a wide area and were we to stretch it we might make a long thin noodle.

The Jiggle Deformer needs to have an axis for each separate fleshy mass so that it can work out whether that mass is being flattened or stretched. It looks at the parent object of the target mass and traces a line from this base to the target mass. The distance between the base and the target mass doesn't matter. The same way as we might push down the cube of dough to flatten it, imagine your finger is going to point from the target mass to the hot point of the parent base in the 3D scene. This axis from the base to the target mass should run through the centre of the fleshy mass. In some cases the actual underlying bone of the figure can be used but in most cases a new target object should be inserted into the scene and then moved into alignment before parenting the target mass to it and parenting them both to the underlying bone.

The Jiggle Deformer also needs to know how big the fleshy mass is in order to tell how much it has been flattened or stretched. The *Size of Mass* value is given in scene units for the unscaled figure and should be set to how far inwards the target mass can be pushed before it hits the underlying bone, or to look at it another way, how far it protrudes from the rest of the body. The size of mass isn't the bust size or belt size but how far those parts stick out in profile. If the *Size of Mass* is set too low then the deformation will be exaggerated and the mass will appear too large when flattened, set the size too high and the volume will not be maintained. The volume *Limit* percentage sets the extreme minimum scaling allowable of the flattened mass, the inverse is applied to a stretched mass.

Figures are best set up in their 'zero' pose or 'reference position' and at time=0 when the Jiggle Deformer is at 0% progress. Each soft fleshy part will need its parent object mass base in addition to a target mass. Another target helper object inserted into the scene is ideal for the mass base. Set the Jiggle *Weight* parameter to 0 so that no deformation is applied to the figure's flesh while positioning the target mass and base. For symmetrical body features, such as breasts and buttocks, make sure the figure is centred on the scene origin (x=0) and set one side up first with a mass base and child target mass then duplicate them with symmetry about x. It can help to rotate the target helper object so that one of its cross hairs lines up with the flatten/stretch axis of the mass. Adjust the target mass and base using the top and left view so that axis lines up as closely as possible with the direction in which the mass will flatten against the body. The deformation of the volume of the flesh will happen evenly around this axis. The target mass should be in the middle of the flesh mass. Parent the target mass to the mass base and then parent the mass base to the underlying bone.



To work out what the *Size of Mass* is for the figure's flesh a reliable method is to select their hip and then in the <Motion> tab enter in a rotation in X of 90°. If the axis of the mass base to target isn't parallel with the Y axis (as in the example above) then to get a more exact value rotate the figure's hip in Y until the line between the targets is aligned with Z looking from a back view. With the figure now on their back take a view from the left side and increase the *Weight* value of the Jiggle Deformer until the fleshy mass has collapsed into the surface of the body. Double the value of the *Weight* at this point gives the best approximate *Size of Mass* to enter. After setting the size check the option to *Maintain Volume*. The *Limit* percentage of scale can be used to prevent the mass from collapsing and stretching too far. Test a range of weight values with the volume now maintained and check the results. While the mass is collapsed adjust the position of the mass target to change how the flesh flattens out over the body then move forward one frame and back update the view. Enter in a negative weight value to see how the fleshy mass will stretch away from the body. Rotate the figure upright in X when the *Size of Mass* is set.

When the Maintain Volume option is enabled the Jiggle Deformer will slow down since each vertex of the model is processed twice, once for the jiggle and once for the volume.

Jelly Recipes

- Not a big enough bounce or wobble ? Increase the *Stretch* value, decrease the *Taughtness* and check the mass target isn't too close to the bone
- Jiggle too slow and floaty ? Increase the *Taughtness*, dont set the *Taughtness Falloff* too high above 2-3.
- Bouncing too fast or too snappy ? Decrease the *Taughtness* and reduce the *Dampening*.
- Jittering rather than coming to rest ? Increase the *Taughtness Falloff*.
- Jiggle goes on for too long when the figure stops ? Increase the *Dampening* value.
- Jiggle is over to quickly when a figure stops moving ? Decrease the *Dampening* and increase the *Taughtness Falloff*.
- Flesh is being distorted ? Increase the *Zone Falloff* above 2.
- The flesh or costume are crinkly at the edges ? Apply a smoothing filter to the weight map, check the zone falloff settings.

The following measures are under review and serve as a rough guide.

For a DAZ/Poser figure in Carrara 6 at the default real world size (~70in) and 25 fps, try the following measures:

Large breasts - Weight=0.9in, Stretch=1.0in, Size of Mass=6.0in, Taughtness=0.5in, Taughtness Falloff=2, Dampening=15%

Normal breasts - Weight=0.45in, Stretch=0.5in, Size of Mass=2.0in, Taughtness=0.15in, Taughtness

Falloff=3, Dampening=20%

Trim buttocks - Weight=0.2in, Stretch=0.4in, Taughtness=0.25in, Taughtness Falloff=4, Dampening=5%

Large buttocks - Weight=0.5in, Stretch=1.0in, Taughtness=0.5in, Taughtness Falloff=3, Dampening=10%

For a DAZ/Poser figure imported into Carrara 5 at the default size (~14in) and 25 fps, use the following measures:

Large breasts - Weight=0.25in, Stretch=0.3in, Taughtness=0.1in, Taughtness Falloff=2, Dampening=15%

Normal breasts - Weight=0.09in, Stretch=0.1in, Taughtness=0.075in, Taughtness Falloff=2, Dampening=20%

Trim buttocks - Weight=0.05in, Stretch=0.075in, Taughtness=0.05in, Taughtness Falloff=4, Dampening=5%

Tips and Tricks

- If you dont have a 3D painting application download and paint on the texture map template. Set a large weight value on the figure to make the flesh droop, edit and save the map then hit the reload button in the texture map section of the Jiggle UI to view any changes.
- Use two Jiggle Deformers, two zones, separate left and right weight maps and mass targets for better results with breasts and butts
- Weight maps dont need to be accurate and when used on a figure with a loose conforming costume, setting a falloff zone for each mass may get better results.
- The effect works best when it is used subtly, using large stretch or weight values will make the mass collapse in on itself and enter into the figure
- It is difficult to avoid poke throughs on figures with tight conforming costumes and more care must be taken with the weight maps and zones.
- Poke through problems are more likely to be caused by the weight map not including enough of the vertices or by morphs applied to the figure and their costume. Set the weight value to 0 on any applied Jiggle deformers and make sure that morphs are not the cause of the poke through.
- The Victoria 4 figure has seperate texture maps for the limbs and torso, breasts and buttocks can be painted on the same torso weight map but the arms and legs share the same space and will overlap so carefully place zones are needed and save the weights before posing the figure.
- If the mass target is placed too far away from the bone then any bending or twisting of the figure will cause exaggerated wobbling
- If the edges of the weight map and zone are too harsh then the edges of the flesh will bend and crinkle and cause rendering artefacts with hard edge shadows - especially if the stretch value is set too high
- For a flabby folded mass try using a large weight map over the area and then separate weight maps with strips across it. Deformers have a cumulative effect and with the first instance move the whole mass then use mulitple instances below it to move the separate folds.
- *(check this) apply a noise tweener or move the mass target yourself in time rather than or as well as the figure to control the jigglng -recommend using slider controls or constraint so as not to loose the original position.*

Planned Improvements

- Allow parent group of a figure to be rotated in the scene for placement into a vehicle etc
- Base taughtness and dampening on time rather than a per frame rate
- Add drop down list of preset values taken from trusted recipes
- It might be possible to code a slight speed increase when maintaining the volume
- Perfect algorithm for low detail collision detection with figures bones for the final version

Support

Sparrowhawke3D is an amateur project so I can't make any promises regarding support, however I'm keen to improve my simple practical plug-ins and share them with the Carrara community.

Special thanks to Untoldwind for the Carrara 6 builds for the Macintosh.

Please do not redistribute the Jiggle Deformer Beta.

For comments, feedback and suggestions email me, Jeremy@Sparrowhawke3D.com.