

SHAPES

Blend Shape Editor for Maya®

User Guide

Version 3.0 beta

Please note that this guide has been created during the development of SHAPES 3 and does not cover all final features.

Also the interface shown in the images does not represent the final version.

For a complete documentation of all features please refer to the video documentation which can be found at:

www.braverabbit.de/shapes/learning

Preface

SHAPES assists in setting up regular blend shapes and corrective shapes.

It allows for sculpting new shapes in a posed state of the model and creates the driving relationship for each target either through Set Driven Keys, the weight driver node, which is provided as a plugin, or shape combos.

In-between shapes can be easily created and interactively adjusted to enhance the corrective shape.

SHAPES also allows for mirroring targets and comes with a variety of tools for splitting, merging, duplicating and more.

SHAPES only works with mesh objects.

General Notes

Plug-Ins

The plugin *SHAPESTools* is required for using SHAPES. It is provided with the script and loaded automatically when running the tool.

In case a scene is set up utilizing the weight driver node, which is part of the *SHAPESTools* plugin, and the scene is to be passed on to a third party, the separate available *WeightDriver* plugin can be downloaded for free from the SHAPES website to allow full compatibility.

Performance

When working with multiple weight driver nodes in the scene it is advised to either hide these nodes or turn off the drawing for the cone and the weight as these will slow down the scene if used in larger amounts.

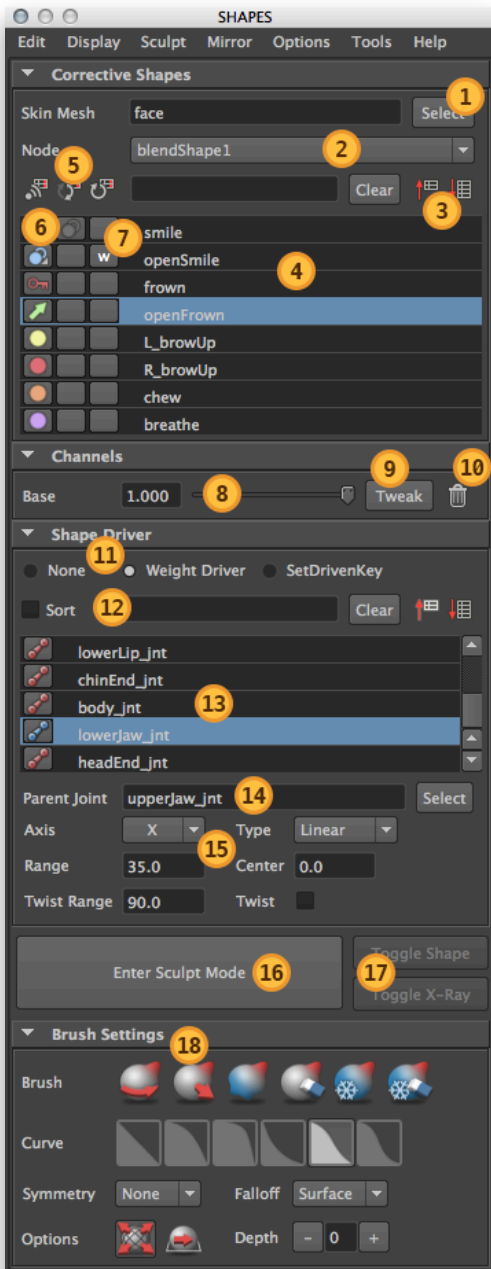
Compatibility

The weight driver node only displays in the default viewport for Maya 2013.5 and earlier. Viewport 2.0 compatibility is supported for Maya 2014 and later.

Workflow

SHAPES only provides limited Undo support. See **Known Issues** for further details.

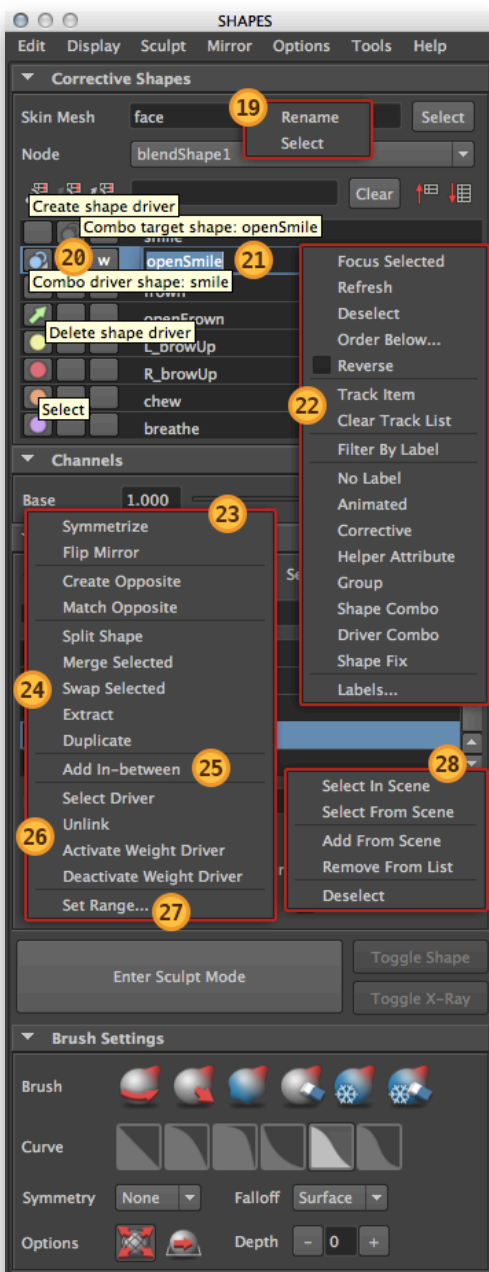
Basic Interface Overview



1. Select the mesh that needs editing. Valid meshes can be bound to a skin cluster node but this is no requirement.
2. Displays the blend shape node being edited.
3. Buttons to resize the target and driver list.
4. The target list, displaying all shapes of the currently selected blend shape node.
5. Value filtering options to display active targets.
6. Driver button column (left column): Each button creates or removes the corresponding shape driver and displays the type of incoming connection for each shape. Colored dots indicate other connections (keyframe, direct connections or expressions)
7. Weight button column (right column): Displays if a shape is weighted and opens the Shape Weights folder.
8. The channel slider shows and edits the value of the currently selected shape.
9. The tweak button enters the sculpt mode for the selected shape to make adjustments to the model.
10. Delete the selected shape.
11. Defines the type of shape driver used for the current shape or a new shape before entering sculpt mode.
12. Sort the driver list alphabetically and search for a given string.
13. The list of all joints found in the skeletal hierarchy of the connected skin cluster. Skin joints appear with a red joint icon.
14. The parent joint is the direct parent of the selected driving joint for the shape and only needed for using the weight driver node.
15. Attributes for defining the shape driver.
16. Enters sculpt mode or exits it if already in sculpt mode.

17. Control the display of the original mesh while in sculpt mode.
18. SHAPES Brush settings. These will only display when sculpting in Maya is enabled but also can be turned off.

Context Menus



19. Rename or select the current blend shape node.

20. Button tooltips.

21. Rename the target shape.

22. Target list filtering and labels.

23. Mirror Actions.

24. Target Actions.

25. Create a new in-between for the selected shape.

26. Weight driver actions.

27. Set a custom slider range for the selected shape.

28. Select the highlighted node in the scene or choose the respective list item based on the scene selection. Add or remove custom nodes from the driver list.

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What's New in Version 3.0

Interface Preferences ►

Show or hide parts of the interface depending on your workflow to save space.

Tweak Propagation ►

Tweaks made to combo drivers can be passed on to combo targets to maintain the appearance of combo based shapes.

Transfer Setup ►

Previously referred to as Update Mesh From Selection. Offers versatile options to transfer the blend shape setup to a second mesh, even if the topology differs. Source and Target setups can also be linked in either direction.

Tweak Transfer ►

Previously referred to as Update Mesh From Selection. Offers versatile options to transfer the blend shape setup to a second mesh, even if the topology differs. Source and Target setups can also be linked in either direction.

Export Node Data ►

Consolidated export options.

Batch Process Mirror ►

Apply mirror actions to all target shapes contained in a group.

Shape Sequence ►

Defines a series of target shapes to evaluate while driving a single end target shape similar to in-betweens with the advantage of editable sequence orders and interpolation.

Region Map ►

Extract and update multiple blend shape targets from a complex single shape based on a color map.

Replace Selected Target ►

New actions to replace the selected target with the current mesh selection.

Installation

To install SHAPES unzip the downloaded archive and open the **installSHAPES.ma** file, which contains the installer.

DO NOT ALTER THE DOWNLOADED FOLDER STRUCTURE FROM THE ARCHIVE

Note:

In the installer window doesn't show when opening the **installSHAPES.ma** file make sure that the execution of script nodes is enabled in the **Open Scene** options of Maya and open the file again.

After confirming the EULA (End User License Agreement) perform the following steps:

1. Select **Easy Install**.

By default the Maya user preferences folder will be used for the installation.

Any previous SHAPES installation will be overwritten.

The SHAPES shelf buttons will be added to the current shelf.

2. Click **Easy Install**.

After the installation all temporary files will be removed.

3. Restart Maya.

If you want to use a custom path for the installation or change other installation settings choose either **Custom Install** or **Advanced Install**.

See the **SHAPES_InstallGuide.pdf** for more details.

Running SHAPES

The installer created the SHAPES shelf buttons.
Click the SHAPES button to open the window.

Alternatively you can manually create a shelf button.
Open the script editor with a new MEL tab.
Enter the following lines and optionally middle-mouse drag these to the shelf to create a shelf button:

```
SHAPES;  
evalDeferred("dockControl -e -r SHAPESDock");
```

You can use the provided icon to decorate your shelf button.

Known Issues

Third Party Compatibility

SHAPES has not been tested with third party skinning plugins.

SHAPES is currently not compatible with plug-ins from Anzovin Studio.

Limited Undo Support

When working with SHAPES it is advised to reframe from using Undo as much as possible.
This is due to a Python limitation in Maya and might lead to incomplete Undo actions.

Using Undo can also lead to slower scene response times because with every Undo action the target shape list needs to be refreshed.

Auto Updating the target shape list can be turned off to improve response times but can lead to differences between the actual scene state and what the target list of SHAPES shows causing user errors down the line.

To refresh the target shape list manually when Auto Update is turned off press the **Refresh** button below the **Auto Update** switch to the right of the target list.

Auto Update is only responsible for a refresh of the target shape list in case of an Undo event.

All actions taken from within the SHAPES interface are automatically updating the target shape list separately.

To avoid any errors related to Undo in general it is best to refrain from using undo when working with SHAPES whenever possible. Especially after adding/deleting target shapes or performing target actions.

Mesh Loading Problems

It is possible, that after using Undo and subsequent actions the working mesh cannot be loaded in SHAPES anymore. Most of these incidents are related to the use of Undo and/or not following the workflow of SHAPES in particular situations.

However, since SHAPES only uses standard Maya nodes (except for the weight driver node) the work is not lost in these cases and the functionality still remains. The issue only affects the loading of the mesh into SHAPES.

SHAPES tries to work around if any issue arises. Problems might include:

- **Orphan Targets (weight[...] Attributes)**
These can appear in rare occasions or when new blend shape targets have been added to a referenced scene. Orphan Targets are missing their alias name and therefore display the actual weight name on the blend shape node. When a mesh is loaded with orphan targets present SHAPES first tries to re-create the actual alias name or, if this is not possible, creates a new alias with the name 'unknown'.
- **Empty Target Shapes**
These are target channels which appear as an attribute on the blend shape node but contain no actual blend shape data.
- **Incompatible List Data**
SHAPES stores all parent, label, ranges and other information on the blend shape node. If the stored data does not match the current blend shape target channels it needs to be rebuild causing the loss of some or all

organization features, such as custom ordering, parenting, labeling and ranges.

However, the actual blend shape data is not affected in any way and only the representation of target shapes in the target list is affected.

See **Reset Target List** for more information.

If any of these issues arises upon loading of the mesh SHAPES will display a warning message indicating that additional information can be found in the Script Editor.

If the problem of loading a mesh into SHAPES persists please contact the **SHAPES Support**.

Interface Preferences

When starting SHAPES for the first time the Interface Preferences window is shown allowing you to individually define which parts of SHAPES should be visible.

Setting a particular feature combination does not influence the performance of SHAPES or limits its functionality but is merely a way to compress the user interface to the features needed in order to save screen space.

For example if corrective animation is not needed for the individual workflow this interface element can be chosen to not display at all.

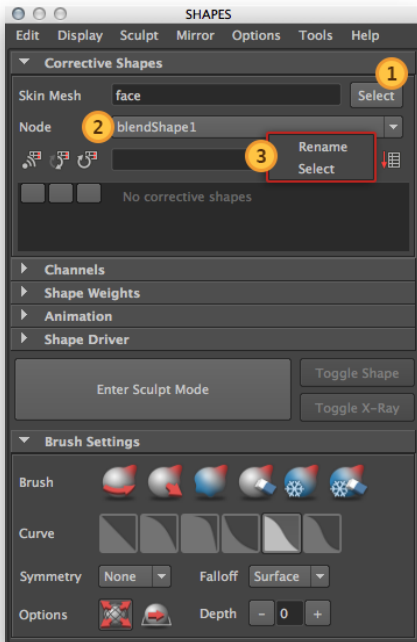
The only exception regarding the limitation of SHAPES is the **Weight Driver** option.

Turning off this option removes the weight driver from the **Shape Driver** folder and thus the access to use it as an alternative to Set Driven Keyframes when defining driving relationships.

Leave the **Weight Driver** option turned off if you don't want to use the weight driver node or if you want/have to create scene files which need to be compatible with a default installation of Maya without any non-standard plug-ins.

The Interface Preferences can always be accessed from **Menu > Display > Interface Preferences**.

Selecting a Mesh



1. Select the mesh and click the **Select** button at the top of the UI.

The name of the mesh will appear in the **Skin Mesh** field.

The selection can be of two types:

- Simple meshes without a blend shape node, skin cluster or any other node.
 - Skinned meshes bound to a skeleton.
2. After successfully loading the mesh the first blend shape node will be listed in the **Node** pulldown menu, if it exists.
 3. Right-clicking the pulldown menu allows for selecting the current blend shape node or to rename it.

Mesh Validation

Intermediate Shapes

When the mesh object is chosen, SHAPES will check for valid geometry, in particular if a shape node is present and if the intermediate object is a valid mesh. Intermediate objects are present, if the mesh is already deformed.

However, it is possible that the mesh contains more than one intermediate shape node due to various actions. If more than one intermediate shape is present SHAPES will inform you with the option to delete it.

Deleting additional intermediate shapes is necessary in order to load the mesh.

Symmetry

During the mesh validation process SHAPES also gathers information about the line of symmetry if **Menu > Mirror > Order Based Mirror** is enabled (default).

The line of symmetry of a mesh is defined by an edge which has both vertices placed at the zero coordinate of the defined mirror axis.

If no edge of the mesh meets this requirement the symmetry process will fail.
In this case the symmetry edge can be defined manually.

See **Mirror Modes** for details.

Also, with **Order Based Mirror** enabled the mesh needs to be only one shell.

If a mesh is build with more than one shell the validation process will inform you and disable **Order Based Mirror**.

Working With a Simple Mesh

Simple meshes can be used right away for sculpting.
No skin cluster or a previously assigned blend shape node is necessary.

Enter Sculpt Mode



1. Click the **Enter Sculpt Mode** button at the bottom of the UI.

SHAPES will immediately put you in sculpt mode to create the first blend shape target.

The sculpt mode automatically:

- creates a copy of the defined mesh and names it *newCorrective*. It appears at the same hierarchy level right next to the source mesh.
- displays the sculpt mesh in isolation mode.
- enables the SHAPES Brush.
- displays buttons in the HUD to exit or cancel the sculpt mode.
- displays the camera gate mask in green to indicate sculpt mode.
- applies the default lambert material to the sculpt mesh to avoid any shader interference which might compromise the display of frozen areas when using the SHAPES Brush.

All display settings can be individually controlled via **SHAPES Menu > Sculpt**:

- Auto Enable Brush
 - Show HUD Buttons
 - Show Frame
 - Use Default Material
 - Isolated Sculpt Mode
2. To better compare the original and the currently sculpted shape use one of the provided buttons:
 - **Toggle Shape** toggles between the display of the original shape or the currently sculpted shape
 - **Toggle X-Ray** displays the sculpted shape in x-ray and shows the original shape.

Exit Sculpt Mode



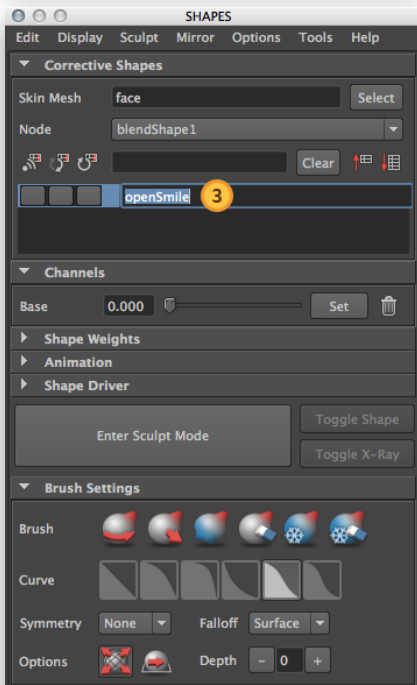
1. To exit the sculpt mode press either the **Exit Sculpt Mode** button at the bottom of the UI or the **Exit Sculpt Mode** HUD button.
2. To cancel the sculpt mode use the **Cancel HUD** button or go to **Menu > Sculpt > Cancel Sculpt Mode**.

Canceling the sculpt mode deletes the sculpted mesh but still creates a new blend shape node.

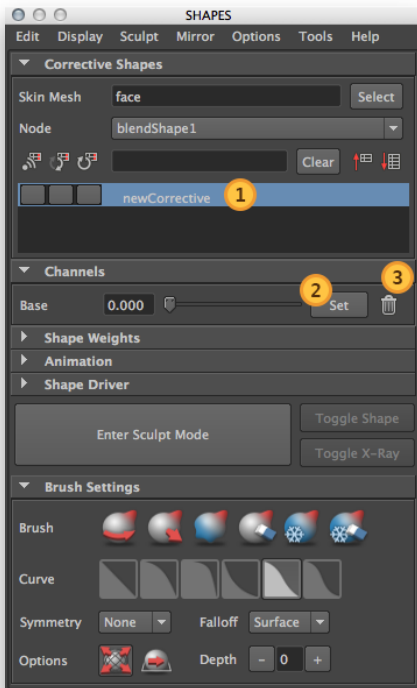
After exiting the sculpt mode the sculpted shape will be added as a new target to the current blend shape node and gets listed in the target list, right below the blend shape node pulldown menu.

3. To rename the new target double click the target and enter a new name.

Renaming a target will automatically rename the connected driver and combo nodes if these exist.



Editing the Target Weight



1. Select the target to edit from the target list.

The Base channel will appear in the Channels folder.

The slider controls the weight of the blend shape target. It is directly controlling the blend shape target weight and also updates itself when driving the target weight through any kind of connection (Note: except for Maya 2014 SAP SP1 due to a blend shape node bug)

2. Click the **Set** button to set the slider to the channel's value.

In case of the base channel this will be 1.0. If the target has any in-between shapes the value will be the position of the in-between shape.

If the target is connected to a driving node, clicking the **Set** button will temporarily disconnect the driver. See also **Unlinking Driven Targets** for more information.

3. Use the **Trash** Icon to remove the target after a confirmation dialog.

The dialog can be bypassed by deactivating **Menu > Options > Confirm Delete**.

It's also possible to set multiple target shapes at once by selecting all target shapes to edit and then setting the channel slider.

Note, that only non-driven targets will be affected.

Clicking the **Trash** button with multiple target shapes selected deletes all targets.

Set Slider Range

By default the slider for each target has a range between 0 and 1.

Though this range is usually sufficient enough you can edit the range to also increase the effect of the target shape or to inverse it.

To edit the slider range for one or more selected target shapes:

1. Select the target shape/s in the list you want to edit.
2. Right-click the Base slider and choose **Set Range...** from the menu.
3. Enter a new range for the slider. The given range must match the format <min>-<max>.

Example:

Enter -1-2 to set the range to start at -1 and end at 2, allowing for a negative effect as well as the double positive shape.

4. Click **OK** to set the new range or press **Default** to set the default range of 0-1.

Unlinking Driven Targets

If a target shape is connected to a driving node, for example an animation curve or Set Driven Key, the Base channel slider will always return to the value from the driving node after it has been released with the mouse. This behavior is due to the nature of connections in Maya.

If you need to temporarily disable the dependency right-click the Base slider label and choose **Unlink** from the menu. The connection will be broken allowing you to freely set the value of the target shape.

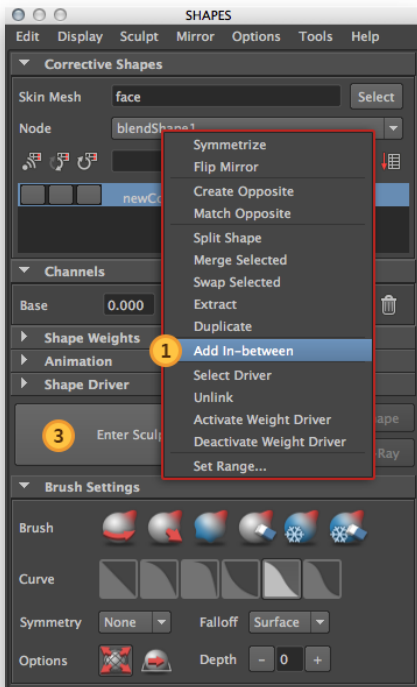
The connection will be re-established if:

- the currently active target shape is re-selected in the target list
- the target list is refreshed
- a new mesh is loaded

A target shape will also be unlinked automatically if the **Set** button is clicked to set the target shape to its maximum value in order to tweak it.

In-betweens

Adding In-betweens



1. If you want to add an in-between shape right-click the Base slider and choose **Add In-between**.

If the base slider is either at 0 or 1 the default in-between value will be set to 0.5.

You can also set the Base slider to the value of where the in-between should be added.

2. A new slider appears. It also allows to redefine the position of the in-between.

Note, that the value of the Base slider is instrumental for generating the in-between regardless of the position of the in-between slider, which only defines where the in-between will be positioned.

3. Click the **Enter Sculpt Mode** button to sculpt the in-between shape.
4. After exiting the sculpt mode the new in-between is added and a new slider will appear in the **Channels** folder defining the position of the in-between.

Editing the In-Between Position

Drag the slider of the in-between to re-define the position within the base target range.

This can be used to adjust how the shape transitions between the different shapes.

Tweak an Existing Target or In-Between

1. If a target or in-between shape needs additional sculpting click the **Set** button to the right of the slider.
This sets the slider to the value of the according shape and the button will change to **Tweak**.

In case the target is connected to a driving node, clicking the **Set** button will temporarily disconnect the driver.
See also **Unlinking Driven Targets** for more information.

2. Click the **Tweak** button to enter sculpting mode and re-shape the target.
3. After applying your edits exit the sculpt mode to update the blend shape target.

Tweak Propagation

When tweaking a shape which is used as a combo driver it might be important to pass the applied tweaks to all subsequent combo targets which are driven by the shape. This is be very helpful to maintain the visual appearance of combo shapes.

For example a smile and a open shape drive a third combo target shape (smile_open). When tweaking the smile shape it's usually expected that the appearance of the smile_open shape doesn't change. This would also be true for any other combo target shape the smile shape drives.

Tweak propagation is only accessible when tweaking single shapes and while other combo drivers are inactive

To perform tweak propagation when exiting tweak mode press the **Exit And Propagate** button at the bottom of the UI or the **Exit And Propagate** HUD button.

Other Ways to Add a Target or In-Between

If you want to add an existing mesh as a target or in-between which has been modeled not using the SHAPES interface or if you want to create a new target shape from the currently deformed state you can access the command through the Edit Menu.

Add Selection As New Default Target

Adds the selected mesh as a new target shape without respecting any other deformation, such as skinning. It's basically the same as manually adding the blend shape target through the Maya menu.

If the model is not in an undeformed state when adding the new target you might not get the expected result when activating the target.

After applying the shape the mesh gets deleted from the scene.

Add Selection As New Posed Target

Adds the selected mesh as a new target shape while taking any other deformation into account.

Use this if you have modeled your new target shape from a posed state of your model.

This command performs additional calculations to correctly apply the new shape when the model is in a deformed state. It undergoes the same process like any sculpted shape when exiting the sculpt mode.

After applying the shape the mesh gets deleted from the scene.

Add Selection As New Default In-Between

This menu item appears in place of **Add Selection As New Default Target** when you are currently in the process of adding a new in-between.

Adds the selected mesh as a new in-between shape without respecting any other deformation, such as skinning. It's basically the same as manually adding the blend shape in-between through the Maya menu.

If the model is not in an undeformed state when adding the new in-between you might not get the expected result when activating the target.

1. If you want to add an already existing in-between shape right-click the Base slider and choose **Add In-between**.

If the base slider is either at 0 or 1 the default in-between value will be set to 0.5.

You can also set the Base slider to the value of where the in-between should be added.

2. A new slider appears. It also allows to redefine the position of the in-between.

Note, that the value of the Base slider is instrumental for generating the in-between regardless of the position of the in-between slider, which only defines where the in-between will be positioned.

3. Select your mesh in the scene which should be added as the in-between shape.
4. Go to **Menu > Edit > Add Selection As New Default In-Between**.
5. The selected mesh will be added as the in-between and deleted from the scene.

Add Selection As New Posed In-Between

This menu item appears in place of **Add Selection As New Posed Target** when you are currently in the process of adding a new in-between.

Adds the selected mesh as a new in-between shape while taking any other deformation into account.

Use this if you have modeled your new in-between shape from a posed state of your model.

This command performs additional calculations to correctly apply the new shape when the model is in a deformed state. It undergoes the same process like any sculpted shape when exiting the sculpt mode.

See **Add Selection As New Default In-Between** on how to perform the command.

Add Original Mesh As New Target

Creates a new target shape from the original, undeformed mesh.

Add Current Mesh As New Target

Creates a new target shape from the currently deformed state of the mesh.

Replace Selected Target With Default Mesh

Replaces the selected target shape with the original, undeformed mesh shape.

Replace Selected Target With Posed Mesh

Replaces the selected target shape with the selected mesh while taking any other deformation into account.

Use this if you have modeled your new target shape from a posed state of your model.

This command performs additional calculations to correctly apply the new shape when the model is in a deformed state. It undergoes the same process like any sculpted shape when exiting the sculpt mode.

After applying the shape the mesh gets deleted from the scene.

Sculpt with Mudbox

SHAPES allows for using Mudbox for the sculpting process. This feature is only available if Mudbox is installed and the Maya file menu contains the *Send to Mudbox* menu item.

To enable sculpting with Mudbox go to **Menu > Sculpt** and activate **Sculpt In Mudbox**. This will automatically send the corrective mesh to Mudbox.

The SHAPES Brush buttons at the bottom of the UI will be hidden when using Mudbox.

After finishing sculpting in Mudbox and sending the mesh back to Maya SHAPES will delete all unnecessary shading nodes and assign the default lambert shader to the mesh.

Auto Apply Shape

With this option enabled the mesh coming from Mudbox will be automatically applied as a new shape and the sculpting mode exited.

Sculpt with ZBrush

SHAPES allows for using ZBrush for the sculpting process. This feature is only available if ZBrush is installed and the default ZBrush install path exists.

Windows

C:/Users/Public/Pixologic/

OS X

/Users/Shared/Pixologic/

To enable sculpting with ZBrush go to **Menu > Sculpt** and activate **Sculpt In ZBrush**. This will automatically send the corrective mesh to ZBrush.

The SHAPES Brush buttons at the bottom of the UI will be hidden when using ZBrush.

After finishing sculpting in ZBrush and sending the mesh back to Maya SHAPES will delete all unnecessary shading nodes and assign the default lambert shader to the mesh.

Auto Apply Shape

With this option enabled the mesh coming from ZBrush will be automatically applied as a new shape and the sculpting mode exited.

Sculpt Outside Maya

If sculpting in an external application is preferred it can be easily done with SHAPES.

Export As FBX

To enable sculpting with the FBX option go to **Menu > Sculpt** and activate **Export As FBX**. This will automatically export the corrective mesh as a FBX file.

The **Enter Sculpt Mode** button label will change to **Export As FBX** and the maya sculpt tool buttons at the bottom of the UI will be hidden.

When using FBX export for the first time SHAPES will ask you for a path to store the FBX file.

By default this will be the data subfolder of the current project but you can also use any other location.

The path will be remembered by SHAPES until the project changes.

After exporting via FBX the mesh is saved as *newCorrective.fbx* at the defined path and the sculpt mode button label will change to **Import From FBX**.

After finishing with the external sculpting the mesh can be re-imported by clicking the **Import From FBX** button, which also directly applies it to the blend shape node.

The import process assumes that the final shape has been saved to the same location and with the same file name as after the export.

Custom Export

To enable sculpting with the custom export option go to **Menu > Sculpt** and activate **Custom Export**. This allows you to export the corrective shape individually with the file format of your choice.

When using custom export the corrective shape is selected and placed at the world hierarchy level. With this selection active use the regular Maya export or any custom export option to save the mesh.

After manually re-importing the modeled shape click the **Exit Sculpt Mode** button to add it to the blend shape node.

Target List

SHAPES provides several functions which help improve the workflow with a large number of target shapes.

Reordering

For better organization of corrective shapes it is possible to reorder the target list by dragging an item with the middle mouse button.

Note, that reordering the target items in the list does not actually change the order of the attributes on the blend shape node but rather stores the user defined order on a custom attribute on the node.

Order Below

As the target list grows reordering via drag & drop can become quite tedious.

In this case you can use the **Order Below...** option to easily place the selected item right underneath the next target item clicked.

Grouping

It is also possible to create hierarchies of corrective shapes by dragging items on top of each other with the middle mouse button.

Note, that despite of the hierarchical order all shapes still act independent from each other. Setting the channel value of a hierarchical parent shape does not influence the values of the child shapes.

You can also add group items to the target list to organize the target shapes. See **Groups** for details.

Solo

To quickly view the selected target shape alone without having to disable all other targets.

Solo activates the selected target and turns off all other target shapes, but only if the affected target shapes are not connected or driven.

Soloing is mainly helpful during the initial setup of target shapes to view individual shapes alone or in conjunction with other shapes before any shape drivers or combos are added.

Labels

Each item in the target list can be color coded for keeping track of individual items or visually group target shapes.

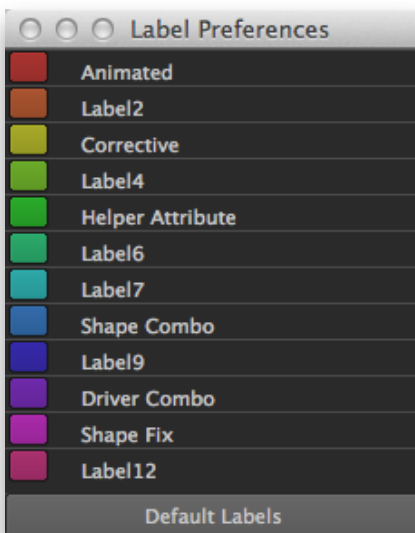
SHAPES has a pre-defined set of labels but which can be individually changed or extended to a total of 12 labels.

Add a Label

- Select a target shape in the list, right-click and choose a label for the item. The combo button of the selected item will receive the label color.
- To clear a label select **No Label** from the right-click menu.

Edit Labels

To edit the list of available labels



1. select a target shape in the list, right-click and choose **Labels...** from the bottom of the menu.
2. The **Label Preferences** window will open listing all currently set labels and colors.
3. Edit the label you want to change. Any label which is not labeled **Label[1-12]** will appear as valid label in the right-click menu of the target list.
4. To clear a label name double-click the label name and delete the name followed by pressing the Enter key. The label name will revert to the numbered label name.
5. Click the **Default Labels** button to reset all labels to their default names.

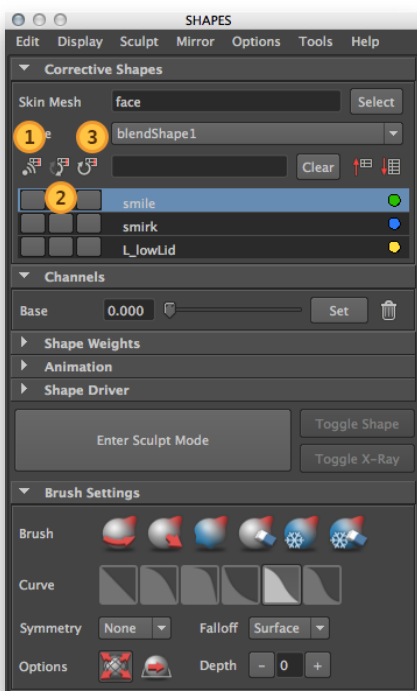
Filter by Label

To filter the target list to show only all targets associated with a specific label

1. select the target shape in the list which is assigned to the type of label you want to filter.
2. Right-click and choose **Filter By Labels** from the menu.

The same process applies when the list should be unfiltered.

Filter by Values



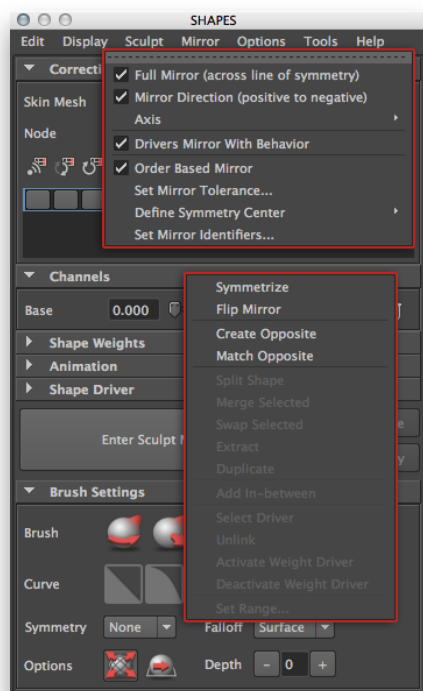
There are three options to filter the target list to indicate or only show all active channels:

1. **Live Show Active Shapes** doesn't filter the list but rather indicates the current channels values live. The indicators will update with every scene change, i.e. time change or value change.
 2. **Show Only Active Shapes** shows all target shapes which currently have a channel value other than 0.
 3. **Show Only Shapes At Maximum** shows all target shapes which currently have a channel value of 1 or greater.
- Click the **Clear** button at the top of the target list to un-filter the list and show all target shapes.

When the list is filtered a colored dot indicates the value of the listed channels.

- Green: active value between 0 and 1
- Yellow: active with a value of 1
- Red: active with a value above 1
- Blue: active with a value below 0

Mirror Target Shapes



Shapes can be mirrored on various ways.

The **Mirror** options are available through **Menu > Mirror**.

The mirror process is independent from the underlying mirror mode. See **Mirror Mode** for details.

Full Mirror

Target shapes extending over the line of symmetry will get fully mirrored to the other side if enabled.

Turning this option off ignores all points on the far side of the model restricting shapes to one side of the symmetry line.

Mirror Direction

By default the mirroring is performed from positive X to negative X, assuming the workflow of starting on the left side of the model first and then mirroring the shapes over to the right side.

Mirror Actions

To mirror a shape right-click the target channel you want to mirror and choose between the following options:

Symmetrize

Makes a shape symmetrical, applying the vertex positions of the source side to the target side.

This action does not create a new target shape.

Flip Mirror

Flips the shape across the line of symmetry taking all points into account resulting in a reversed shape.

This action does not create a new target shape.

Create Opposite

Copies the entire blend shape channel, including its in-betweens, to a new channel for the other side of the model.

This option is only available for the base shape of each target. In-betweens can only be copied to the other side as part of the entire blend shape channel.

Match Opposite

After making adjustments to a shape on one side of the model this action can be used to apply the same edit to the shape on the other side.

This option is also available for each in-between shape making it possible to update single in-betweens on the opposite side.

The process requires correctly named target channels in order to find the sibling of the shape.

Batch Process Mirror

If it is necessary to mirror multiple targets at once it is possible to perform a mirror action to all target shapes contained in a group.

To apply a mirror action to all targets in a group

1. select the group of targets which should be processed

2. go to **Menu > Edit > Batch Process Mirror** and select the mirror action to be applied

Please note, if the process encounters errors, for example because of missing driver siblings, the process is interrupted and the remaining shapes are not created.

Identifiers

SHAPES has a pre-set list of side identifiers used for the mirroring process, which is necessary to automatically set or find the name of the mirrored shape.

In some cases it might be necessary to edit the list to make it usable for a custom workflow.

Edit the list through **Menu > Mirror > Set Mirror Identifiers...**

To add custom identifiers to the list enter the respective labels in the fields. Please note, that all labels must be coming in pairs and are comma separated.

The list can be reset by clicking the **Default** button.

Mirror with Shape Drivers

If a shape is copied to the other side to create a new shape sibling the connected shape driver is mirrored as well.

The behavior of the mirrored shape driver depends on the type of driver and if the joint is positioned at the center of the model or on an explicit side.

After mirroring it might be necessary to adjust the shape driver for the correct result.

Mirror with Shape Combos

When mirroring a shape which is the target for a shape combo the combo relationship will be mirrored as well.

However, if the mirror source shape is driven by a combo based on a shape restricted to one side of the model the sibling for the shape must exist prior to mirroring.

The mirror process only creates a mirrored combo relationship but not the actual combo driver.

If a target shape is mirrored which acts as a combo driver no outgoing combo connections will be mirrored. Only incoming combos are respected for the mirror process.

Mirror with Behavior

By default behavior-style mirroring is anticipated.

This usually means that the same control values produce symmetrical results even when used on opposite sides. For example selecting both arms of the character and setting a positive rotation value rotates both arms down.

However, some character rigs are build in an orientation-style manner and have to be treated differently.

If you work with a rig that doesn't support behavior-style mirroring, i.e. Rapid Rig or Advanced Skeleton, the behavior mirroring must be turned off through

- **Menu > Mirror > Drivers Mirror With Behavior**

Please note that non-behavior mirroring with shape drivers is not yet fully supported and might not work in all cases.

Mirror Modes

SHAPES has two basic modes for performing the mirror process.

- Order Based Mirror
- Position Based Mirror

Each mode has it's own advantages and disadvantages and can have an impact on the mirror result or even the success of the mirror process.

Order Based Mirror

This mode is the default setting of SHAPES.

The mirror process is based on the vertex order of the mesh which allows to even work with shapes which are not 100% symmetrical.

Please note that even this makes it possible to work with asymmetrical meshes there is no guarantee that the mirrored result works as expected in all cases.

A symmetrical mesh is always the best starting point for a successful mirror.

Symmetry Edge

The order based mirroring relies on a symmetry center defined by an edge which has both vertices placed at the zero coordinate of the set mirror axis.

SHAPES tries to automatically find the symmetry edge during the mesh evaluation process when loading the object.

If the symmetry edge has been found it will be listed as a menu item at **Menu > Mirror > Define Symmetry Center > Symmetry Edge: ...**

Selecting this menu item selects the edge component of the mesh.

Set Symmetry Edge

If you want to set a different edge component as the symmetry edge:

- Select the edge of the shape you want to use as the symmetry edge.
- Select **Menu > Mirror > Define Symmetry Center > Set Symmetry Edge**.

Symmetry Edge Errors

If the mesh evaluation process fails to find a valid symmetry edge and reports an error, perform the **Set Symmetry Edge** process to manually set the symmetry edge and reload the mesh.

Limitations

Order based mirroring can not be used if the mesh is composed of more than one shell.

If the selected mesh has more than one shell the mesh evaluation process will give a warning and order based mirroring will be disabled.

Position Based Mirror

If **Order Based Mirror** is disabled the mirror process will be based on the position of the vertices.

The advantage of position based mirroring is that the mesh is not limited to one shell only.

The drawback of position based mirroring is that the mesh needs to be fully symmetrical in order to find the vertices on the other side of the model.

A symmetrical mesh is always the best starting point for a successful mirror.

If a model is not perfectly symmetrical the mirror process tries to find the corresponding vertex on the other side of the model based on distance.

In case of slightly asymmetrical shapes it is possible that the mirroring will find the wrong mirror vertices which results in a falsely mirrored shape.

The mirror process will fail if the no mirrored vertex is found within the range of 0.01 units (default) from the mirrored source position.

The tolerance value can be set manually.

Tolerance

If the mirror process fails or results in unexpected mirrored shapes it is possible that the default value for finding mirrored vertices are incompatible with the geometry.

In this case try to adjust the tolerance value by going to **Menu > Mirror > Set Mirror Tolerance....**

Setting the tolerance value too high might also result in expected mirrored shapes.

There is no guarantee that the mirror process will work in all cases.

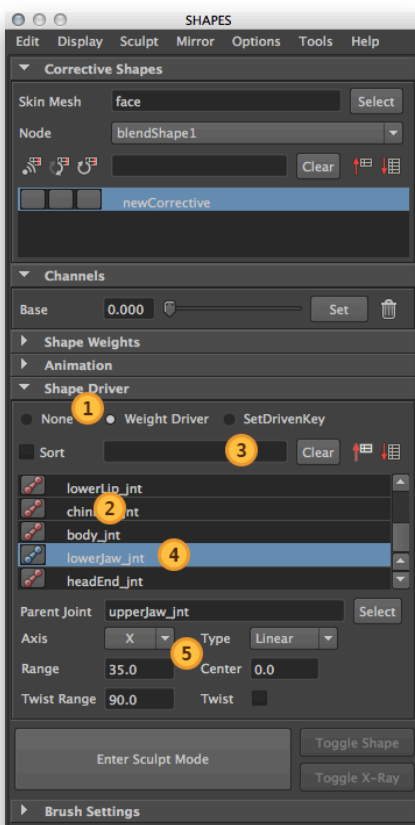
Shape Drivers

If the model is bound to a skeleton with a skin cluster a shape driver can be added to control the shape for the current pose when creating new shapes. Alternatively the shape driver can also be added later.

Shape drivers can be either regular Set Driven Keys or via the weight driver node, which is supplied with SHAPES.

By default no shape driver is created.

Creating a New Shape with a Shape Driver



To create a new shape with a shape driver enable

- **Menu > Options > Auto Add Shape Driver.**

By default this option is turned off to prevent that the new shape is connected to a shape driver if shape driver settings are still present from a previous target shape selection.

Usually it is more convenient to first create the target shape and set up the shape driver in a separate step (see [Assigning a Shape Driver to an Existing Shape](#)).

Before entering sculpt mode to create a new shape define the shape driver attributes in the **Shape Driver** folder.

1. Set the driver to either **Weight Driver** or **SetDrivenKey**. The available parameters will change accordingly.
2. The driver list will show all joints of the model. Joints used for skinning will appear with a red joint icon.
3. You can optionally search for the driving node.
4. Select the driving node from the driver list. Double clicking the joint name will select the node in the scene.
5. Adjust the attributes for the shape driver if needed.

You can right-click the driver list for more selection options.

Weight Driver Attributes

The weight driver is a vector reader which determines the output weight by a target vector rather than a joint angle.

Driver List

The selected joint in the driver list defines the current axis of the pose and the pose angle. A locator will be parented to this joint serving as a target vector for the weight driver.

Parent Joint

This field is automatically populated when selecting a joint in the list. It is the direct parent of the selection and will be used to parent the weight driver node to. You can also select a different node in the scene and click the **Select** button.

Axis

The selection is defined by the down/first axis of the selected joint in the list and used to define the direction for the weight driver. If the joint orientation is not set up properly the assumed axis might not be correct and must be changed manually.

Range

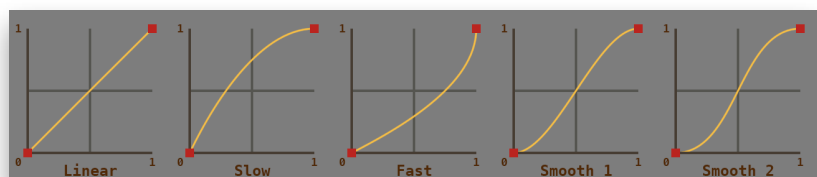
This value shows the current joint rotation related to the pose. It defines the radius of the cone of influence with the current pose at its center and the neutral pose at the edge of the cone.

Center

A value larger than 0 will widen the center area of the weight driver where the resulting weight value will be 1, allowing for some motion within the target angle without sacrificing the weight value.

Type

Defines how the resulting weight values will be interpolated between 0 and 1.



Twist / Twist Range

With this enabled the resulting weight of the weight driver is also dependent of the orientation of the target locator. If the target vector is positioned in a way that the output weight would be 1 but the target locator has a rotation value matching the twist value or greater the output weight would still be 0.

The **Twist Range** defines how far the target locator can twist in either direction affecting the output weight.

SetDrivenKey Attributes

This defines a regular Maya based Set Driven Key relationship between the selected joint and the target shape.

Attribute

A list of all key-able attributes of the selected driver. Changing the attribute selection updates the **Start/End** fields with the attribute values at the time of selection.

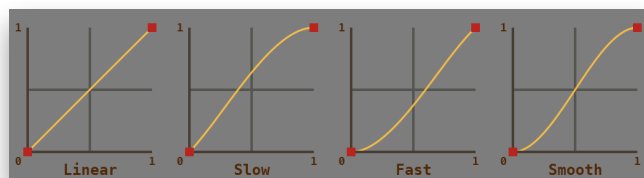
If the attribute list gets too long in case of many custom attributes on the driver node the list can be filtered through enabling **Menu > Options > Ignore Zero Attributes** to only list attributes which are currently active.

Start/End

The **End** field shows the attribute value of the selected driver and attribute at the time of the driver selection.

Type

Defines the types of keyframe interpolation used to build the Set Driven Keyframe curve.



Infinity

Sets the pre/post infinity for the Set Driven Keyframe curve.

Exiting the Sculpt Mode and Adding a Shape Driver

If the **Shape Driver** options have been properly set up the driving relationship will be automatically created when the sculpt mode is exited.

Working With a Shape Driver

When a shape is controlled either by a weight driver node or Set Driven Keyframe the target channel slider will always reflect the target weight.

If the slider is moved manually the driving influence of the shape driver is temporarily disabled, allowing for testing the influence of the current shape.

If the slider is dropped the shape driver will re-gain its influence and the slider will be set back to the current value of the shape driver.

If you need to temporarily disable the dependency right-click the Base slider label and choose **Unlink** from the menu. The connection will be broken allowing you to freely set the value of the target shape. See also **Unlinking Driven Targets** for more information.

Deactivating/Activating the Weight Driver Node

Any weight driver node can be deactivated to see the effect of the blend shape without the control of the driving weight.

To deactivate or re-activate the according driver right-click the **Base** channel of the selected target and choose **Deactivate Weight Driver**. The weight driver will be bypassed and the weight will be set to 0.

You can also use **Menu > Display** to control the visibility of the weight driver nodes or to activate/deactivate all weight drivers in the scene.

Custom Reader Position for the Weight Driver Node

The output value of the weight driver node is based on a target vector defined between the position of the weight driver node and a locator.

In most cases this setup is sufficient and doesn't require any manual input.

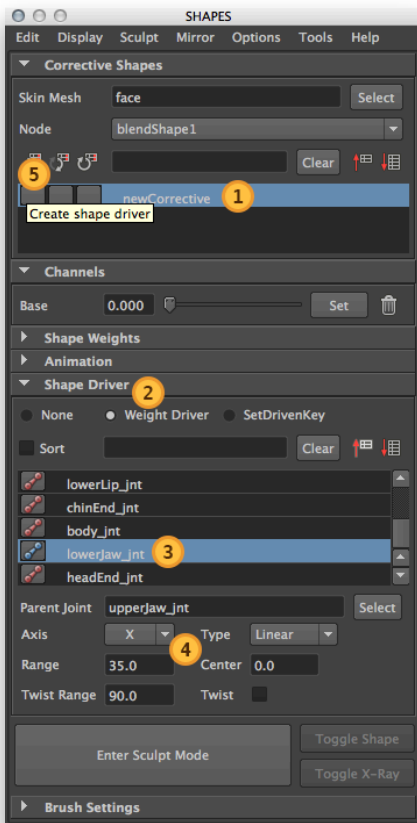
However, if a rig consists of a 'flat' hierarchy it might be necessary to have the weight driver node in a particular part of the rig but referring to some other node to be used as the source point of the target vector.

To define a custom source position for an existing weight driver

1. select the weight driver driven target shape in the list you want to edit.
2. Select the node in the scene which should be used as the new source position for the weight driver.
3. Choose **Menu > Tools > Set Weight Driver Source Position**.

The command output will display the established connection.

Assigning a Shape Driver to an Existing Shape



If a shape driver hasn't been assigned to a shape at the time of sculpting it is possible to add the driver afterwards.

1. Select the shape in the target list to add the shape driver to.
2. In the **Shape Driver** folder set the driver to either **Weight Driver** or **SetDrivenKey**. The available parameters will change accordingly.
3. Select the driving node from the driver list.
4. Adjust the attributes for the shape driver if needed.
5. Click the left button of the shape in the target list. The tooltip will display *Create shape driver*.
6. A dialogue shows, asking to confirm creating the shape driver.
7. After confirming the process the shape driver will be setup immediately and the icon for the selected driver type will display on the button; an arrow for a weight driver node and a key symbol for Set Driven Key.

Removing a Shape Driver

If a shape driver should be no longer associated with a target shape

1. click the (left) shape driver button of the target shape in the list, which displays the symbol of the shape driver.
2. Confirm the deletion of the node.

Overriding the Confirmation Dialogue

Creating and deleting shape drivers, as well as setting up and removing combos has been streamlined as much as possible.

However, the process has been made so easy that it's almost too easy to create new or delete existing relationships with one click.

In order to avoid accidental connections or disconnections the confirmation dialogue has been included.

If needed the dialogue can be overridden by disabling **Menu > Options > Confirm Button Action**.

Updating Existing Driver Attributes

If a target shape is selected which is driven by a shape driver the shape driver folder will reflect the current settings of the driving node.

Changing any of the settings related to the current driver will automatically update the driver.

Ignore Skin Joints

When loading a mesh with a skin cluster all joints will be added to the driver list which are influencing the skin or are within the same hierarchy as the skinning joints.

If listing all joints is not necessary or if the number of joints is very large and adding all joints is not favored the automatic listing can be ignored.

To ignore the listing of skin joints disable the option found in **Menu > Options > Auto List Joints On Load**.

Add New Nodes to the Driver List

If a node which should act as a shape driver but is not listed in the driver list it can be added by

- selecting the node in the scene you want to add, right-click the driver list and choose **Add From Scene**.

Auto Add Unlisted Driver

New nodes can automatically be added if the option **Menu > Options > Auto Add Unlisted Driver** is enabled.

- Select the node in the scene you want to add, right-click the driver list and choose **Select From Scene**.
- If the node is not already listed it will be added and then selected in the driver list.

If a target is selected which is driven by node not listed in the driver list and the option **Auto Add Unlisted Driver** is enabled the driving node will be added to the driver list.

Note

If the driver list is filtered, either by name or by type, and a new driver is added to the list but not matching the filtering it will not be displayed until the filtering is cleared.

Remove Nodes from the Driver List

If you want to remove a node from the driver list

- right-click the driver list and choose **Remove From List**.

Filter by Driver Type

You can filter the driver list by the type of driver to quickly find a certain node by type rather than by name.

- To filter the driver list click the button to the left of the driver name to display only drivers which match the node type of the clicked button.
- To un-filter the list click any icon button of the driver list.

Note

If the driver list is filtered, either by name or by type, and a new driver is added to the list but not matching the filtering it will not be displayed until the filtering is cleared.

Shape Combos

A very important part in working with corrective shapes is the creation of specific relationships between shapes.

For example, a smile shape might work well with the mouth closed but might doesn't give the expected result when the mouth is opened.

Therefore a new corrective shape is needed to fix the smile with the mouth in its opened state but only when the smile is active.

Shape combos allow for the creation of such relationships.

In the above example of the smile the smile corrective for the open mouth would need to be driven by the joint that creates the open mouth pose.

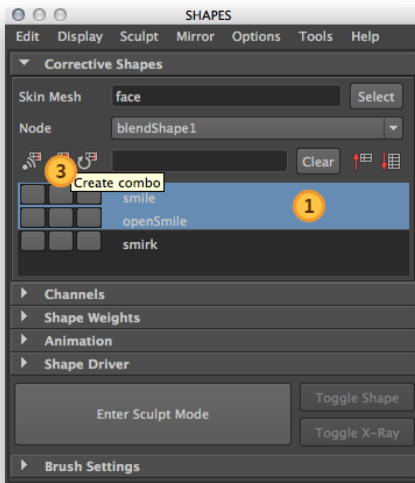
The shape combo would then create the relationship between this driven pose and the state of the smile shape.

Combos can have any number of driving shapes controlling one target shape.

If the target shape is already driven by a shape driver this connection will also be part of the combo.

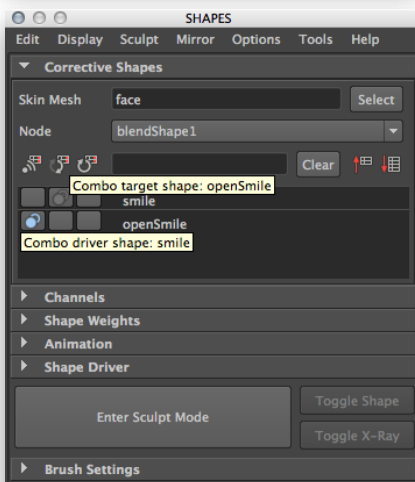
Combos can be edited at any time, allowing for adding or removing driving shapes and also defining a new target shape.

Creating a Shape Combo



To set up a shape combo between two shapes

1. select any number of shapes from the target list which should control the combo.
2. Additionally select the target shape which should be driven. The last selected target shape will always be the driven shape by the combo.
3. Click on any middle button in the target list. The button tooltip will display *Create combo*.
4. After confirming the combo creation the shape combo driver items in the list will display a muted combo symbol, indicating that it's controlling a shape combo. The combo target item in the list will display a blue combo symbol on the left button, indicating that it's being influenced by a shape combo.



If the target list gets too long it can become harder to select a consecutive list of target shapes to create a combo. Especially in combination with the search function.

In this case item tracking can be used to store each separately chosen target shape in a list which is then used to create the combo.

To set up a shape combo using item tracking

1. select each target to be used as the combo driver individually and choose **Track Item** from the target list right-click menu.
2. Select the combo target item last and also choose **Track Item** from the right-click menu.
3. Click on any middle button in the target list. The button tooltip will display *Create combo*.
4. After confirming the combo creation the new combo has been set up with the items previously selected.

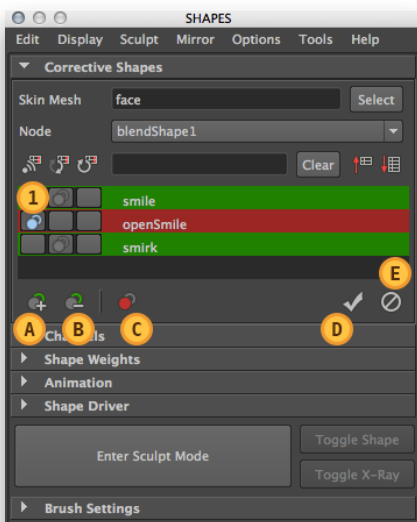
If the driven shape is also controlled by a shape driver the combo icon will display a small triangle in the lower right corner.

Moving the mouse over the muted combo source button will display the combo target shapes in the tooltip.

Moving the mouse over the left combo driver button of the target shape the tooltip will display the shape name of the combo sources.

Each target shape can be used as the source for multiple shape combos but each target can only be controlled by one driver.

Editing a Shape Combo



1. Click the left button displaying the combo symbol of the target shape to edit the driving combo.
 2. After confirming and entering the edit mode the target list highlights the participating target shapes:
 - **combo drivers** are displayed in green
 - the **combo target** is highlighted in red
- A: To add new target shapes to the combo select one or more items in the list and click the **Add To Combo** button below the target list.
 - B: To remove target shapes from the combo select one or more items in the list and click the **Remove From Combo** button below the target list.
 - C: To define a different target shape select a new item in the list and click the **Set Combo Target** button below the target list.
 - D: To update the combo and leave the edit mode click the **Update Combo** button.

- E: To cancel the edit mode and discard any changes click the **Cancel** button.

Deleting a Shape Combo

1. Click the left button displaying the combo symbol of the target shape that should be removed from the combo relationship.
2. After confirming the action the combo is deleted and the original shape driver re-connected to the target shape, if any.

Channel Actions

When a target shape is selected in the target list various target actions are available from the slider right-click menu in the **Channels** folder.

Split Shape

This action splits a target shape into separate shapes for the left and right side.

Splitting a shape is an interactive process which allows you to define the position and blending of the two resulting shapes.

To split a shape:

1. Select the target shape in the list you want to split.
2. Right-click the Base slider and choose **Split Shape** from the menu.

The two resulting shapes for the left and right side will be created and listed underneath the source shape in the target list.

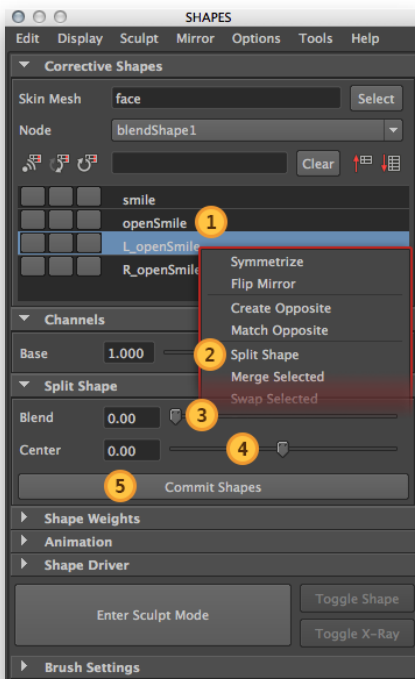
The shape for the left side is set to 1 to visualize the result of the split shape sliders.

Below the **Channels** folder the **Split Shape** folder shows the split shape sliders and the commit button.

3. Adjust the **Blend** slider to define how far the blending will extend from the center position to the left and right side. The value of the blend slider represents Maya scene units.
4. Adjust the **Center** slider to define the center position of the blending. A positive value moves the center in positive direction of the defined axis (**Menu > Mirror > Axis**).

The **Blend** value is centered around this **Center** value.

5. After adjusting the blend values click the **Commit Shapes** button to transfer the blend values to the shape for the right side.



Merge Selected

If you need to combine two or more shapes into one you can use this action.

1. Select any number of target shapes in the list you want to use for the merging process.
2. Right-click the Base slider and choose **Merge Selected** from the menu.

A new shape will be created and listed right below the first selected target.

Merging two or more shapes takes the current value of each shape. If the source shapes should be combined in their full state you need to set them to 1 before merging.

Swap Selected

Allows you to exchange the blend shape data between the two selected target shapes. Only the shape information will be replaced while any connections to the targets will remain.

This makes it easy to replace an already existing shape with an updated version without the need to rebuild all the related connections and driving relationships.

1. Select the two shapes which you would like to use to replace each other.
2. Right-click the Base slider and choose **Swap Selected** from the menu.

Extract

Right-click the Base or in-between slider of a target in the **Channels** folder and select **Extract** from the menu.

The blend shape target data is used to create a new mesh resembling the selected shape.

Duplicate

Right-click the Base slider of a target in the **Channels** folder and select **Duplicate** from the menu.

The blend shape target data is then copied to a new target and appears directly underneath the selected item in the list.

Shape Sequence

Similar to in-betweens a shape sequence defines a series of target shapes the mesh has to run through until eventually showing the target end shape.

The advantage of using a shape sequence in contrast to default in-betweens is that the type of blending and interpolation can be defined by the user.

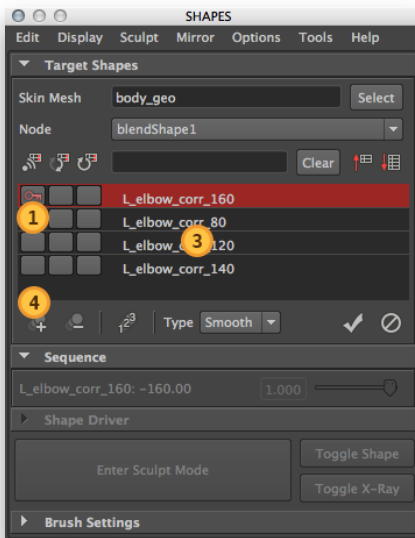
The linear interpolation style of in-betweens can often be visually limiting and may not produce the expected results whereas targets in a shape sequence may also overlap to produce the desired deformation.

Shape sequences are controlled through default Maya Set Driven Keyframes and can be edited through the Graph Editor.

Note, that any custom editing of shape sequence curves is currently not maintained when editing a shape sequence or when exporting the blend shape setup.

Creating a Shape Sequence

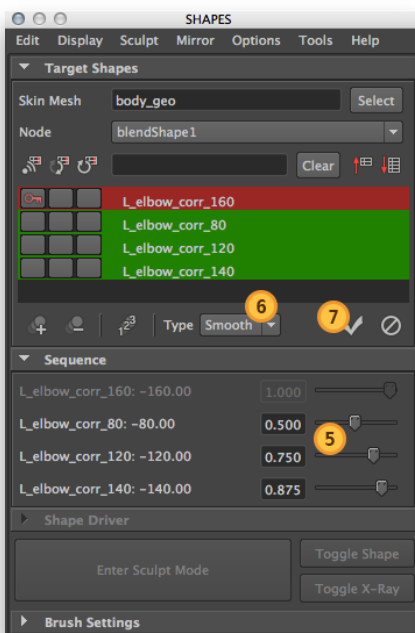
A shape sequence can only be created if a shape driver for the sequence end target is already existing.



1. Begin editing of a shape sequence by clicking the shape driver button in the target list.
2. Choose **Edit Sequence** from the dialog. The target list is now in edit mode for the sequence and displays the sequence target shape highlighted in red.
3. Select one or more target shapes which should be part of the sequence.
4. Click the **Add To Sequence** button.
5. In the sequence folder below the target list set the value for each sequence target at which it should be active.

The slider value displays a relative value between 0 and 1, where 1 is the value of the sequence end target.

The value right next to the shape name displays the actual driver value at which the target shape is triggered.



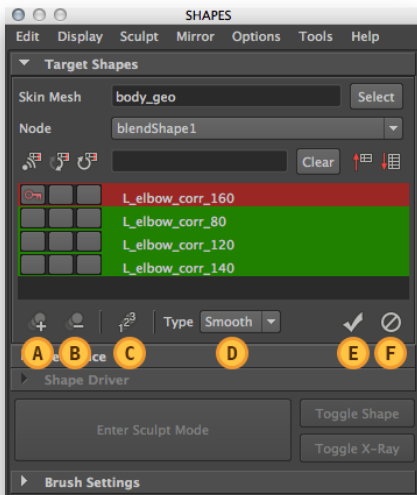
6. Set the type of interpolation for the blending between the sequence shapes from the **Type** option menu.
7. Click the **Update Sequence** button to create the sequence.

When a shape sequence has been set up the shape driver of the target shape, which is also the target end shape of the sequence, will display a little triangle in the lower right corner.

All in-between sequence shapes can be identified through the shape sequence symbol.

A sequence shape cannot be controlled by anything else than the sequence it is part of but it can be used as a driver for shape combos.

Edit Functions



- A: To add new sequence shapes to the sequence select one or more items in the list and click the **Add To Sequence** button below the target list. The selection will be added to the sequence list below.
- B: To remove sequence shapes from the sequence select one or more items in the list and click the **Remove From Sequence** button below the target list. The selection will be removed from the sequence list below.
- C: To sort the order of sequence shapes according to their values click the **Sort Ascending** button below the target list.

Sorting the list manually is optional and used only as a guide for the user to have all sequence shapes appear in order.

The sequence shapes are ordered automatically when creating or updating the sequence.

- D: To set the blending between the sequence shapes select a type of interpolation from the **Type** option menu.

Smooth

Sets a smooth interpolation between the sequence shapes.

Linear

Sets a linear interpolation between the sequence shapes.

Silke

Defines a fast in/slow out type of interpolation between the sequence shapes.

- E: To create the sequence and leave the edit mode click the **Update Sequence** button.
- F: To cancel the edit mode and discard any changes click the **Cancel** button.

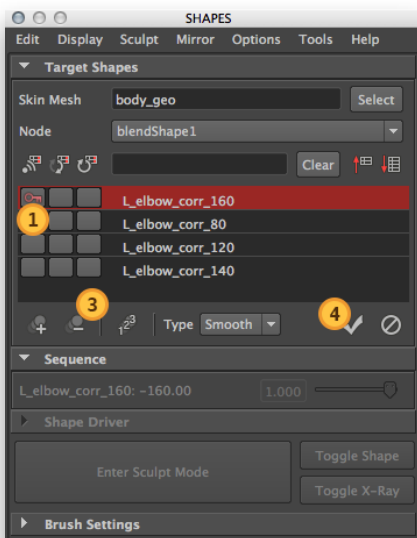
Editing a Shape Sequence

A shape sequence can be edited the same way as it has been created.

1. Click the shape driver button of any participating shape of the sequence in the target list.
2. Choose **Edit Sequence** from the dialog. The target list is now in edit mode for the sequence and displays the sequence target shape highlighted in red and the sequence in-between shapes highlighted in green.

Continue to edit the shape sequence as outlined in **Create a Shape Sequence**.

Deleting a Shape Sequence



1. Click the shape driver button of any participating shape of the sequence in the target list.
2. Choose **Edit Sequence** from the dialog. The target list is now in edit mode for the sequence and displays the sequence target shape highlighted in red and the sequence in-between shapes highlighted in green.
3. Select all sequence in-between shapes which are highlighted in green and click the Remove From Sequence button.
4. Click the **Update Sequence** button to finish editing the sequence.

All sequence targets will be removed.

Region Map

The Region Map feature of SHAPES allows to start with a single complex shape, like a full face expression, and separate it into several individual shapes for each region of the face.

The advantage of using a region map is that after extraction all the partial target shapes add up to resemble the original complex shape they were derived from, keeping overlapping issues and negative influences to a minimum.

These issues are very common when manually extracting partial shapes based on weight maps as the overlapping/blending areas between the different regions either have the affected vertices not move enough or move too much if the blending hasn't been defined in a precise way.

SHAPES takes care of this automatically and can display if some areas have been forgotten during the painting process.

Painting regions can even be done in a rough pass with wide overlaps between them and SHAPES still produces the expected result through the normalization process.

SHAPES allows up to six regions per map which are individually painted as standard black and white maps but can be displayed simultaneously through a color gradient. The colored display is for a general visualization and not meant for editing.

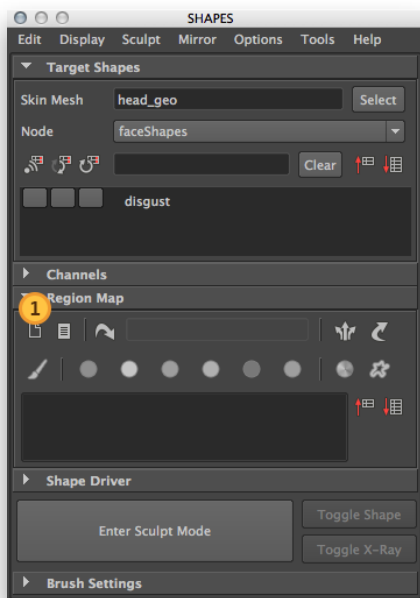
Using all six regions of a map allows for extracting twelve blend shape targets, split as left and right shapes, from a single shape.

Since region maps are based on the underlying topology it's also possible to use one map for multiple complex expressions allowing for a fast generation of a multitude of blend shape targets.

Also, if the source shape changes the extracted target shapes can be easily updated.

Creating a Region Map

Before starting with the painting process for the different regions a region map needs to be present.



1. Click the **New Region Map** button to open the Region Labels window.

2. Enter a name for the region map.

3. Enter a name for each region you want to paint

or

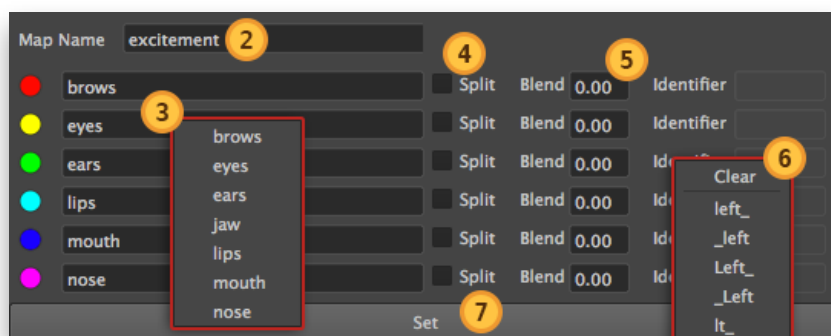
right-click the name field of a region and choose a pre-defined label.

4. Enable the **Split** checkbox if the region should be used to create two shapes for either side of the model.

5. In case the shape should be split set the **Blend** value to define the width of the blend from one side to the other.

The blend value is in world units and similar to the blend value when splitting a shape though the channel actions.

See **Split Shape** for more information.

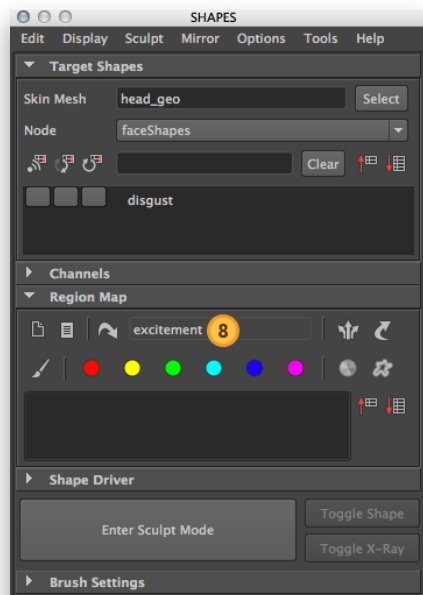


6. Optionally define a side identifier when a shape should be split.

Right-click the **Identifier** field to choose from a list of pre-defined labels.

If no identifier is chosen the default identifier L_/R_ will be used.

The list of identifiers can also be edited. See **Identifiers** for more information.



7. Press the **Set** button of the Region Labels window to close the window and set the newly defined map as current.

8. The region map name will be displayed in the current map field.

For each defined region the respective color button will be activated to show it's color but there is no action attached to it yet.

Note, that even the map is now the current map it hasn't been stored to disk yet but is merely kept in memory. If another new map is created or an existing map is loaded the current map will be replaced and the settings will be lost.

Painting Regions

When a map is made current either by creating a new map or through loading an existing map the buttons for painting the regions become active.

To paint regions for the current map:

1. Enter the paint mode by clicking the brush button.

The paint mode creates a duplicate of the current shape and applies the default shader to be able to paint the regions.

If sculpt mode isolation is enabled in **Menu > Sculpt > Isolated Sculpt Mode** the mesh will also be put in isolation.

2. Choose one of the colored buttons to paint the respective region.

Each colored region button also displays the name of the region in it's tooltip.

The shape will display in black and the paint color is set to white.

Painting shape regions uses the default Paint Vertex Color Tool.

Right-clicking the region button allows to perform:

Brush Reflection

Toggles the brush reflection for the paint vertex color tool since it's not available in the default Maya hotkey set.

Flush Vertices

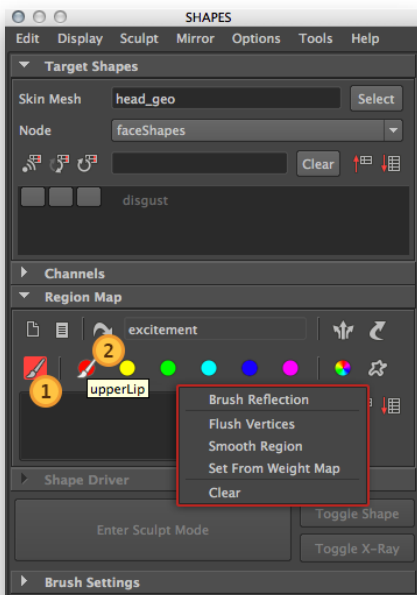
Floods the entire model with the current region map.

Smooth Region

Globally smooths the entire region.

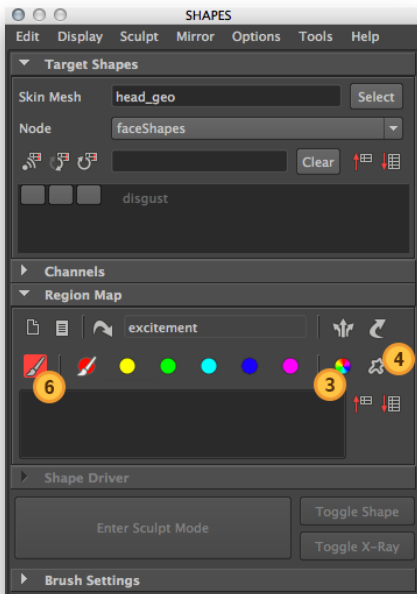
Set From Weight Map

Applies the values from the selected weight map in the weight map list to the current region.



Clear

Clears the entire region data for the current region.



3. To visualize the combination of all regions at once click the **Display All Regions With A Color Gradient** button. This will display all defined regions with their respective colors with normalized values, as opposed to the raw values which are defined during the paint process.

Note, that the visualization mode is only meant for viewing and not for painting purposes. Even if the color is modified by using the paint tool it will not be stored in the separate regions.

4. Click the **Display All Partial Weights** button to show a black and white representation of which parts of the model hasn't been represented yet by any region. White areas display parts that are not part of any region.
5. Click either the **Display All Regions With A Color Gradient** or the **Display All Partial Weights** button to return to the paint mode.
6. To exit the paint mode and store the regions to the current region map click the brush button.

If the current region map has been newly created and is not yet present as a file on disk it will now be created and stored to data/SHAPES/regions/<nodeName> of the current project.

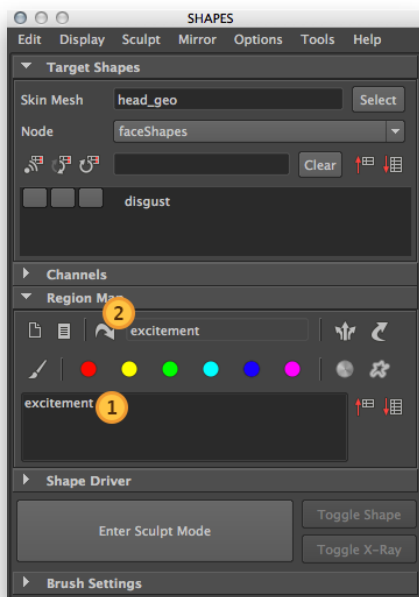
The region map will also be shown in the region map list. If the region map already exists it will be updated with the new data.

Or

to exit the paint mode and discard all changes made to the regions right-click the brush button and select **Cancel**.

All changes will be ignored and no data will be written.

Loading a Region Map

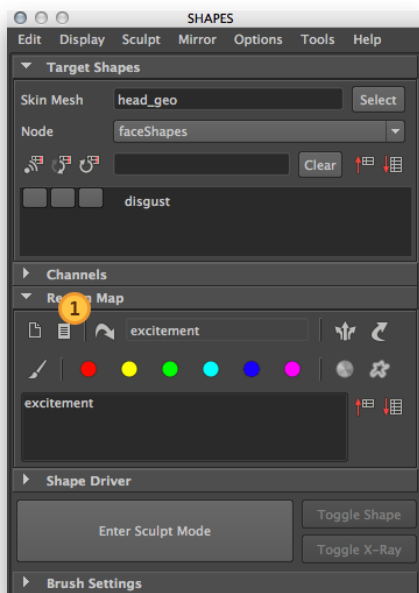


To load an existing region map

1. select the map in the region map list you want to load
2. click the **Load Region Map** button

The selected map is loaded and displayed as the current map.

Editing a Region Map

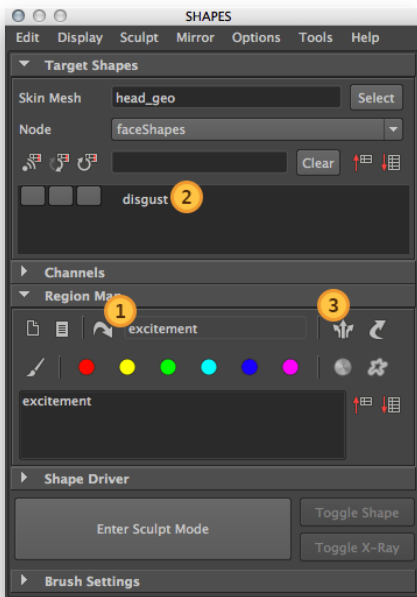


When a map is loaded it's always possible to edit the name of the regions as well as their split and blending attributes.

To edit the current region map:

1. Click the **Edit Region Map** button to open the Region Labels Window.
2. Edit the region labels and split attributes.
3. Click the **Set** button at the bottom of the Region Labels window to store the changes to the region map.

Extract Region Map to Targets



To finally create the destination blend shape targets and add them to the target list

1. make sure that a region map is currently active.
2. Select the target shape in the target list the partial shapes should be extracted from.
3. Click the **Extract Region Map To Targets** button.

Each region will be sequentially extracted based on the respective map and a split will be performed if defined in the region attributes.

The newly created shapes will be added to the blend shape node and appear in the target list.

If any shape already exist on the blend shape node due to a earlier extraction the particular target shape will be replaced with the new shape.

Export Region Map

Exports the independent regions of the current region map as normalized weight maps.

Each region gets stored as a separate weight map file and gets added to the weights list.

Renaming a Region Map

To rename a region map double-click it's name in the list and type in a new name.

Deleting a Region Map

Right-click a selected region map entry in the region list and choose **Delete** to remove the file from disk.

Corrective Animation

SHAPES has a basic toolset for setting up and working with corrective animation.

Corrective animation comes into play after the actual animation process. At this point the animated geometry is the result based on skin clusters, blend shapes and many other deformers and nodes allowing to put the mesh in to a particular pose. But no matter how much effort has been put into the setup and rigging of the model there will always be specific poses which will not work correctly or were not anticipated during rigging. Or maybe the current pose should be pushed just a little further and the given controls don't allow for this modification.

Corrective animation can be used in these situations to create a better and stronger pose or to iron out deformation problems in specific areas.

Animated correctives are just simple blend shapes which blend in and out at specific frames helping you to model the final result while being in the current pose - something that SHAPES does anyway.

Set Up

Preparing for corrective animation is very simple. You can either use your already existing blend shape node and use the animation features of SHAPES or you can add an additional blend shape node to carry only the shapes used for corrective animation.

To create a new blend shape node for corrective animation:

1. Select the last blend shape node from the **Node** pulldown menu at the top of the window.
2. Select **Menu > Edit > Add Blend Shape Node After Current**.

It's also possible to create a blend shape node at the front of the chain with **Menu > Edit > Add Blend Shape Node** but adding one after the last blend shape node in the chain is more logical.

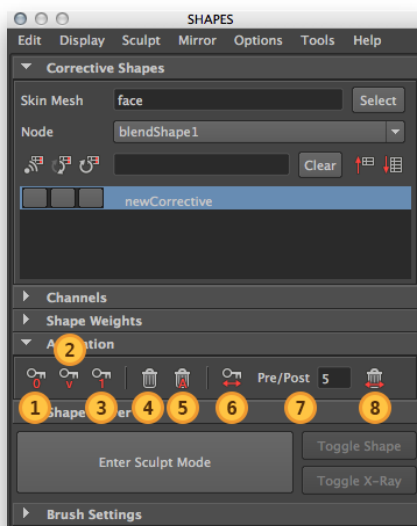
If you want to add a new blend shape node manually make sure that it's ordered before the skin cluster node if one exists. This is important for extracting the corrective shape based on the current pose of the model.

Animation

Open the Animation folder of the interface to expose the controls to set and delete keyframes for the currently selected target shapes.

Opening the Animation folder automatically selects the current blend shape node so that you can see any related keyframes in the time slider of the Maya interface.

Selecting a shape from the target list while the Animation folder is open selects any connected animation curve node to only display keyframes relating to the current selection.



1. **Key Selected With Zero Weight**
Sets a keyframe for the selected shapes with a weight value of 0.
2. **Key Selected With Current Weight**
Sets a keyframe for the selected shapes with the current weight value.
3. **Key Selected With Full Weight**
Sets a keyframe for the selected shapes with a weight value of 1.
4. **Remove Key At Current Frame**
Deletes the keyframe for the selected shapes at the current time and sets the weight to 0.
5. **Remove All Keys**
Deletes all keyframes for the selected shapes and sets their weight to 0.
6. **Key Selected With Range**
Sets a keyframe for the selected shapes with a weight value of 1 at the current frame and also creates bracketing keyframes with a weight of 0 before and after. The range is defined by the **Pre/Pose** range value.

7. Pre/Post Range

Defines how far apart the pre/post keyframes are from the current time when setting a shape keyframe with range.

8. Remove Key In Range

Deletes the keyframe for the selected shapes at the current time and sets the weight to 0.

SHAPES will also look at neighboring keyframes with a value of 0 and deletes these as well. The distance of these bracketing keyframes does not have to match the value of the **Pre/Post** field, only the keyframe value of 0 is considered.

If a neighboring keyframe is not 0 it will not get removed.

Shape Weights

SHAPES directly supports easy editing of blend shape weight maps per target shape.

The default Maya paint blend shape weights tool is used to assign the vertex weights.

A target shape with weight assignment will be indicated by a 'w' on the weight button (third button) in the target list.

All weight map actions, excluding export, work on several selected target shapes at once.

Note, that in order to use the weight map actions, for example trim or invert, a weight map must be already assigned to a target shape, meaning that the weight button displays the 'w'.

If you want to perform a weight map action to newly painted weights and the 'w' is not displayed yet make sure that you first leave the painting mode by clicking on the **Paint Weights** button. This assigns the painted weights to the target and lets you use the weight map action.

NOTE:

Painting blend shape weights with the tool settings open is not recommended and doesn't work properly in conjunction with SHAPES.

KEEP THE MAYA TOOL SETTINGS WINDOW CLOSED WHEN PAINTING SKIN WEIGHTS WITH SHAPES.

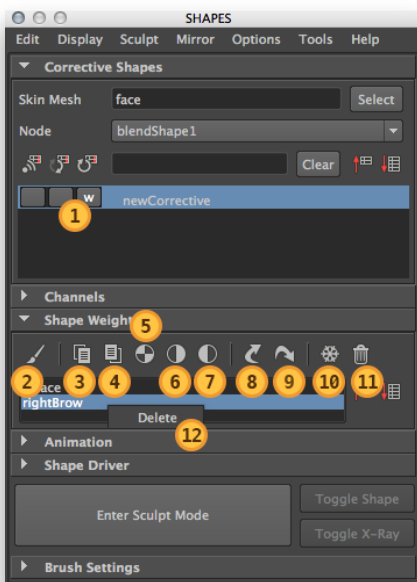
Having the tool settings open overrides the current shape selection in the target list of the SHAPES window and sets the paint operation to only work on the deformer weight rather than a specific target.

Another disadvantage using the tool settings window is that Maya by default only allows to paint weights for the first blend shape node, even if more than one blend shape node is present in the history of the mesh.

Show the Weights Interface

To access the weights tools click the right weights button of a shape in the target list or open the Shape Weights folder manually.

Button Actions



1. Weights Button

Displays if a target shape has weights. Clicking the button opens the Shape Weights folder if collapsed.

2. Paint Weights

Toggles the paint blend shape weights tool for the selected target shape.

Right-Click for basic paint operations, such as setting the paint value or flooding the current selection.

3. Copy

Copies the weights from the current shape to the clipboard.

4. Paste

Pastes the weights from the clipboard to the current shape.

5. Invert/Mirror

Inverts the weight assignment. Right-click the button for mirroring the weights. The axis is defined by the mirror axis in **Menu > Mirror**.

6. Trim/Crop Negative

Sets the weight value to 1 for all vertices which are on the negative axis of the model. The axis is defined by the mirror axis in **Menu > Mirror**.

As the result the painted weights will only appear on the positive side of the model.

Right-click the button to **Crop** the weights on the negative axis by settings the weight value to 0.

7. Trim/Crop Positive

Sets the weight value to 1 for all vertices which are on the positive axis of the model. The axis is defined by the mirror axis in **Menu > Mirror**.

As the result the painted weights will only appear on the negative side of the model.

Right-click the button to **Crop** the weights on the positive axis by setting the weight value to 0.

8. Export

Export the weights to a weight map file located at data/SHAPES/weights/<nodeName> of the current project.

The weight map will also be shown in the weight list.

During Sculpt Mode this button saves the currently frozen areas from the SHAPES Brush to a weight map for later use.

9. Import

Imports the selected weight map file in the weight list to the current target shape.

During Sculpt Mode this button loads a previously stored weight map and uses it to define frozen areas for the SHAPES Brush.

10. Freeze and Delete

Bakes the current weight map to the target shape and deletes the weight assignment.

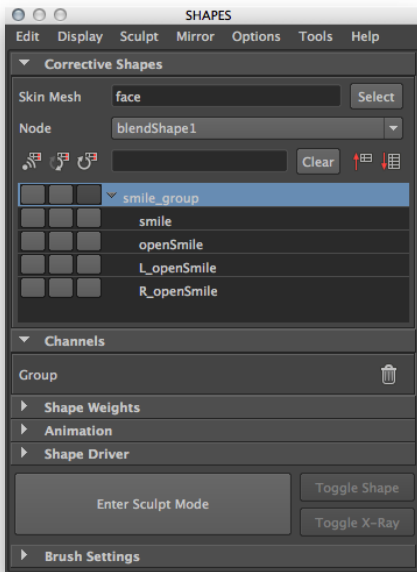
11. Delete

Remove all weight assignment form the current target shape.

12. Delete Weight Map

Right-click a selected weight map entry in the weight list and choose **Delete** to remove the file from disk.

Groups



To better organize the target shape list it is possible to create hierarchies of targets.

Even though it is possible to parent targets directly to each other (but without any dependencies) it is more efficient to use a dedicated grouping item to create logical groups of various target shapes.

A group attribute is a custom attribute on the blend shape node similar to the helper attribute but it appears without a slider in the **Channels** folder.

To add a group attribute select **Menu > Edit > Add Group**. The attribute is added to the blend shape node and listed in the target list.

Drag the target items you want to add to the group onto the group item with the middle mouse button.

Helper Attribute

In some situations it can be necessary to add an additional attribute to either use for a controlling mechanism or to simply use as a divider to organize large amounts of target shapes.

The shape helper attribute is a custom attribute on the blend shape node which can be utilized for many needs.

To add a shape helper attribute select **Menu > Edit > Add Shape Helper Attribute**. The attribute is added to the blend shape node and listed in the target list.

Note, that the selected helper attribute is labeled *Helper* with it's slider in the **Channels** folder and setting the slider to 1 doesn't switch the **Set** button to *Tweak*.

Create Attributes From Selection

This function allows for creating custom attributes from the selected items in the target list on the selected node in the scene with existing connections.

It can be useful to create animatable attributes on controllers without having to animate the blend shape channels directly.

1. Select a node in the scene you want to add attributes to.
2. Select one or more target shapes in the target list.
3. Select **Menu > Edit > Create Attributes From Selection**.
4. A new window will appear allowing you to define the range of the attribute which will be created and the shape value range it will control.

If **Limit To Range** is selected both value ranges will be limited.

5. Click **Add Attributes** to add the attributes to the selected node.

Bake Current Mesh To Original

While building a blend shape setup it might be necessary to update the base mesh due to a modified or updated design. This usually poses problems because this might interfere with the blend shape targets already created.

This option allows to update the base mesh keeping the already existing target shapes intact, which will then act on top of the replaced base mesh.

To apply the current shape to the original mesh go to **Menu > Edit > Bake Current Mesh To Original**.

Note, that any other mesh editing, especially altering the density of the mesh will not be respected and is not supported due to how blend shapes work.

Bake Tweaks To Original

While building a rig and the related deformation it might be necessary to update the original model due to design changes or other reasons.

Usually changing the basic geometry poses undesirable results when blend shapes and skin deformations are already in place.

Since SHAPES always looks at the original mesh when creating or editing a target shape, edits stored on the tweak node are ignored, thus leading to differences between the base shape and the new or edited target shape.

To permanently apply the edits stored on the tweak node to the original mesh go to **Menu > Tools > Bake Tweaks To Original**.

Note, that only the point position offsets stored on the tweak node will be applied to the original mesh. Any other mesh editing, especially altering the density of the mesh will not be respected.

Cleanup Tweak Node

During the creative sculpt process it can happen that the mesh is modified assuming an active sculpt mode which actually is not the case.

As a result the modeled changes are stored in the tweak node of the mesh's history resulting in unpredictable and unwanted sculpt results further down the line.

If this is the case this action can be used to unwanted vertex offsets from the current tweak node.

If you experience that after sculpting a new shape or tweaking an existing one the result after exiting the sculpt mode doesn't match your actual work you have done it is possible that you previously made changes to mesh while not being in sculpt mode.

In this case go to **Menu > Tools > Cleanup Tweak Node** to remove the offsets.

If, for some reason, your node network misses a tweak node the process will inform you and give you the option to re-create the tweak node and all related nodes.

Please save your work before executing this command. It cannot be guaranteed that this will work in all cases and solve the issue.

Export Node Data

If it is necessary to rebuild the rig because of fundamental changes you can export the entire blend shape setup including all Set Driven Keys, weight driver nodes, combos and direct connections and apply the setup back into a fresh scene.

All blend shape targets will be extracted and saved as a Maya ASCII file and all target information will be written to a MEL file.

Both files are saved to

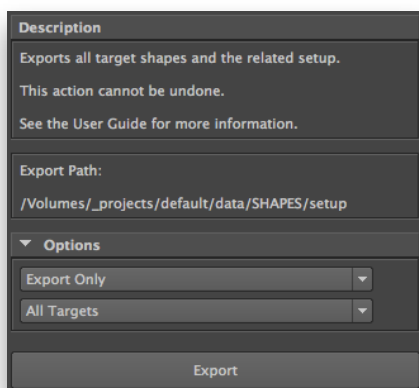
data/SHAPES/setup

of the current project.

Note, that the process will not export any animation curves or expressions.

Please also note that there is no guarantee that the process will be successful under any circumstances. It is always recommended to save the scene prior any update.

To export the blend shape setup go to **Menu > Tools > Export Node Data**



Export Options

Export Type Option

Export Only

Exports the setup without changing the scene.

Delete Shape Drivers and Combos After Export

After exporting the setup all shape drivers and combos will be removed. The blend shape node will remain in the scene, along with all targets. All custom ordering of target shapes, as well as parenting, labels and ranges will not be modified.

Delete Entire Blend Shape Setup After Export

After exporting the setup the blend shape node will be deleted as well as all shape drivers and combos.

This is useful for resetting the mesh and preparing for manually importing a previously saved setup.

Rebuild Blend Shape Setup

The same as **Delete Entire Blend Shape Setup After Export** but followed by the automatic import of the setup to return the scene to it's previous state.

This is useful to clean up the blend shape node.

Target Option

All Targets

Exports all targets, shape drivers, combos and shape sequences.

Reference Edits: Targets

In case of a referenced scene this option can be used to export all newly created targets to be able to import them to the original scene.

Applying is done manually by importing the setup after opening the original file.

Maya's scene referencing does not work well in conjunction with adding new blend shape targets in the referencing scene. The target data is written but the blend shape target name is not preserved after closing and opening the scene.

This option exists in order to get around this shortcoming and should only be performed right after creating new blend shape targets while the target names are still preserved.

It is not advised to use this option after a saving and re-opening the referencing scene.

Reference Edits: Targets and Drivers

The same as **Reference Edits: Targets** but also includes all newly created drivers and combos.

Import

To import the blend shape setup go to **Menu > Tools > Import Node Data...** and select the blend shape setup from the submenu you want to import.

This simply sources the MEL file created during the export process.

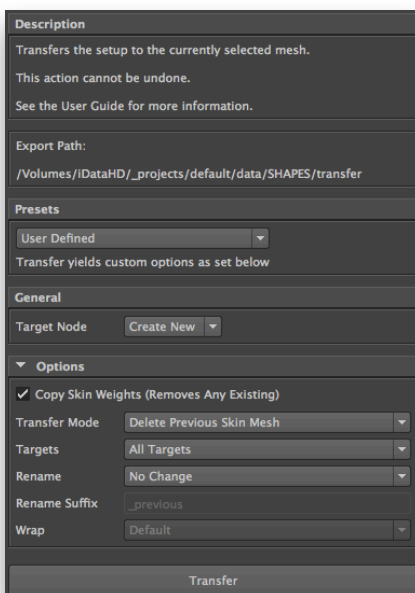
Transfer Setup

If it becomes necessary to rebuild the rig because of topology changes to the mesh it is possible to transfer the entire blend shape setup onto the updated mesh, as well as rebuild the skin information through the default Maya Copy Skin Weights function in a unified process.

The update process utilizes the **Export/Import Node Data** functionality of SHAPES, but only stores the files temporarily and deletes them afterwards.

Note, that the process will not maintain animation curves or expressions.

Please also note that there is no guarantee that the process will be successful under any circumstances. It is always recommended to save the scene prior any update.



To update the blend shape setup with a new mesh

1. select the mesh in the scene which should replace the existing mesh with the blend shape node
2. go to **Menu > Tools > Update Mesh From Selection**
3. choose a transfer preset from the **Presets** option
or
set custom transfer options from the **Options** folder.
4. click Transfer to execute

Transfer Options

Copy Skin Weights

Copies the skinning from the source mesh to the selected mesh through the default Maya Copy Skin Weights. If the selected mesh already has a skin cluster assigned it will get deleted and replaced with a new one.

Transfer Mode

Delete Previous Skin Mesh

Transfers the blend shape setup to the selected mesh and removes the source mesh from the scene.

Transfer Targets Only (No Drivers)

Only transfers the target shapes without any combos, drivers, groups, helpers and ordering information. Combos, drivers and connections will remain on the source blend shape node.

The source mesh and blend shape setup will remain in the scene.

Transfer All

Transfers the blend shape setup to the selected mesh and removes all combos, drivers and connections from the source blend shape node.

The source mesh and blend shape node will remain in the scene but without any combos, drivers and connections.

Transfer And Use Previous As Master

The same as **Transfer Targets Only (No Drivers)** but connects the source blend shape node to the new mesh to act as a master controller for both meshes.

Transfer All And Use Selection As Master

The same as **Transfer All** but connects the new mesh blend shape node to the source mesh to act as a master controller for both meshes.

Targets

All Targets

Respects the entire blend shape setup, including groups and helper attributes.

Selected Targets/Groups (No Drivers)

Only selected blend shape targets and those within selected groups will be processed.

If a group is selected all content will be included, regardless the depth of the hierarchy, except the group itself.

Only transfers the target shapes without any combos, drivers, groups, helpers and ordering information.

Ignore Selected Targets/Groups (No Drivers)

Processes all blend shape targets except any selected and those within selected groups.

If a group is selected all content will be excluded, regardless the depth of the hierarchy.

Only transfers the target shapes without any combos, drivers, groups, helpers and ordering information.

Rename

No Change

Keeps the source mesh name and new mesh name after applying the transfer.

The **Rename Suffix** has no function when this option is chosen.

Keep Previous Name

Renames the new mesh to the source mesh name.

The source mesh is renamed by adding the **Rename Suffix** to avoid name clashing.

Swap Names

The source mesh and the new mesh will get their names exchanged after the transfer.

Rename Suffix

Controls the renaming when the rename option **Keep Previous Name** is chosen.

Also used internally for the transfer process.

Wrap

The wrap option is only available when the source mesh is chosen to remain in the scene through the Transfer Mode option.

Default

The standard setting for transferring the blend shape setup from the source mesh to the selected mesh through a wrap deformer.

Wrap Only

Disables all other transfer options. The source mesh is mainly used as a wrap deformer for the selected mesh. No blend shape targets or any other data is transferred.

Transfer And Wrap A Duplicate

The same as Default but in addition the selected mesh is duplicated and wrap-deformed by the source mesh. This setup is mainly meant for checking the quality of the transferred skin deformation by comparing the deformation results of the wrap to the skin deformation applied through the default Maya Copy Skin Weights.

Choosing this option also enables the **Tweak Transfer** workflow after transferring the setup.

This allows for editing to the transferred skin information and applying the changes made to the related blend shape targets.

See **Tweak Transfer** for more information.

Tweak Transfer

After transferring the blend shape setup to a target mesh with different topology it might be necessary to adjust the skinning (currently performed through the default Maya Copy Skin Weights) while respecting related blend shape targets.

Tweak Transfer calculates the deformation differences between the skin deformed mesh and the wrapped duplicate of the transfer target mesh after editing the skin weights and applies the changes to the selected blend shape target.

Tweak Transfer is only enabled if a wrap mesh exists in the scene which was created with the **Transfer Process'** option **Transfer And Wrap A Duplicate**.

The Tweak Transfer submenu is meant to be torn off allowing you to have floating buttons.

Enter Skin Tweak Mode

This toggles the deformer envelope for all blend shape nodes on the mesh

Tweaking the skin deformation is best done while viewing it independent from anything else.

Update Selected Target From Wrapped Mesh

Performs the difference calculation between the currently deformed mesh and the wrap deformed reference mesh and applies the result to the selected target, including all related in-between shapes.

The action is only executed if the selected target is active.

And error will be displayed if there are other targets contributing to the current pose.

Performing Tweak Transfer

1. go to the pose that needs skin tweaking
2. press the menu item **Enter Skin Tweak Mode**; all blend shape nodes on the mesh will be temporarily disabled
3. adjust the skinning
4. when done, press **Exit Skin Tweak Mode** to re-enable all blend shape nodes
5. then select the target shape in the list that needs updating
6. select **Update Selected Target From Wrapped Mesh**

Connecting Blend Shape Nodes

When working with meshes with different resolutions but using the same blend shape setup it might be helpful to drive one blend shape node with the other.

When transferring the blend shape setup the transfer options already include to establish this connection.

SHAPES provides a basic functionality in case this connection between the two blend shape nodes needs to be broken, updated or established afterwards.

Connect Blend Shape Nodes

Allows to create a driver/driven relationship between two blend shape nodes.

Select the node from the list which should act as the driver and select a second node which should be driven.

Press **Connect** to create the connection.

The connection performed is based on the selection in the target list.

If nothing is selected all target channels from the driving blend shape node will be used for the connection.

If only particular channels should be connected select these channels in the list first and then press **Connect**.

Disconnect Current Blend Shape Node

Breaks the connections on the currently loaded blend shape node to the driving node.

If nothing is selected all target channels will be disconnected.

If only particular channels should be disconnected select these channels in the list first and then go to **Menu > Tools > Disconnect Current Blend Shape Node**.

Remove Orphan Target

When deleting a target shape it can happen that the process doesn't finish as expected and a *weight[...]* entry is still left in the target list. This can happen in rare occasions.

These orphan attributes are possible to influence the performance of SHAPES and should be removed.

In case such a left over entry named *weight[...]* appears in the target list select it and choose **Menu > Tools > Remove Orphan Target**. This should permanently delete the item in the list.

Again, there haven been incidences where the selected item appears with the name *temp*. If this happens, select this item in the list and click the trash icon in the Channels folder.

Reset Target List

Resets the target list appearance and brings all target channels back to the order how they appear on the blend shape node.

Choose **Menu > Tools > Reset Target List**.

This clears all custom ordering of target shapes, as well as parenting, labels and ranges.

Resetting the target list can also be performed with the selected mesh in the scene if for any reason the mesh cannot be loaded.

Non-compatible data stored in the custom attributes on the blend shape node used by SHAPES might prevent the mesh from being able to load into SHAPES.

If you have trouble loading the mesh into SHAPES you can try to:

1. select the mesh in the scene
2. choose **Menu > Tools > Reset Target List**
3. load the mesh into SHAPES

If these steps don't resolve the issue please contact the **SHAPES Support**.