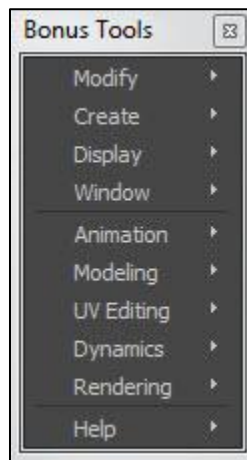




## Overview

Bonus Tools 2013 is a free collection of useful Maya scripts and plug-ins. After installing Bonus Tools, an additional pull-down menu will be added to the end of the main Maya menu. This new menu provides easy access to a variety of tools and utilities for daily use. This new version of Maya Bonus Tools has been completely reorganized and now mimics the layout of the standard Maya menu sets. Each sub-menu contains a number of related tools. Each of these can be torn off and floated just like standard Maya menus.



Bonus Tools are provided to you on an "AS-IS" basis; Autodesk® does not provide any direct support in connection with this collection.

However submission of problems and suggestions are encouraged and can be logged through from the Maya Help menu with Report a Problem or Suggest a Feature.

## Availability

Bonus Tools are available on the area -> [http://area.autodesk.com/bonus\\_tools](http://area.autodesk.com/bonus_tools)

Tutorials can be found on the new Bonus Tools resource page -> [Bonus Tools Resource Page](#)

## What's New?

- Modify -> Drag Move Tool
- Modify -> Mirror Translate/Rotate
- Modify -> Copy Pivot from Last Selected
- Modify -> Align Pivot(s) to Bounding Box
- Window -> Attribute Editor Template Builder
- Animation -> Pose Blend Shape Editor
- Modeling -> Flatten Components
- Modeling -> Slide Components
- Modeling -> Delete Edge Tool
- Modeling -> Delete Vertex Edges Tool
- Modeling -> N-Sided to Quad Tool
- Rendering -> Refresh Texture Swatches
- Rendering -> Auto Layer Texture(s)

## What's been fixed or updated?

- Modify -> Proportional Transform
- Modify -> Store Transform Values
- Create -> Create Menu from Shelf
- Display -> Toggle Single/Double Sided
- Display -> Toggle Poly Surface Area HUD
- Display -> Toggle Poly Volume Area HUD
- Animation -> Store Pose
- Animation -> Time Warp Animation
- Modeling -> Merge All Verts/Edges by Distance
- UV Editing -> Auto Map Multiple Meshes
- Rendering -> Change Texture Paths

**Note: all new and updated features are highlighted in red in the documentation below.**

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# Installation

## **Windows**

Install the BonusTools package by double clicking on the icon and following the instructions. It will install to ....\Program Files\Autodesk\MayaBonusTools2013

## **Linux**

As root, install the BonusTools package with the rpm command (e.g. rpm -i BonusTools2013). It will install to /usr/aw/maya2013/BonusTools.

## **Mac OS X**

1. Extract the package from the disk image.
2. Double click the package and the files will be copied to /Users/Shared/Autodesk/maya/2013

## **Python Scripts**

BonusTools contains a few python scripts. However the installer does not automatically setup the path for these tools. If you already have a userSetup.py file, open it in a text editor and append these lines...

```
import sys
sys.path.append("C:\Program Files\Autodesk\MayaBonusTools2013\python")
```

If you do not already have a userSetup.py file simply copy the one provided with BonusTools.

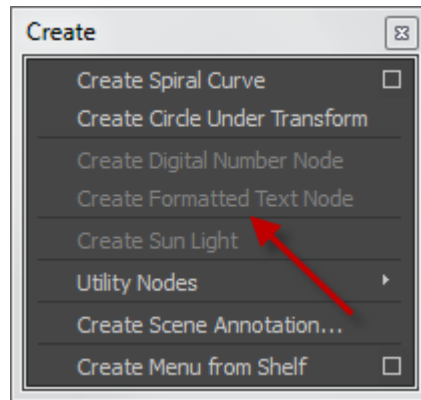
```
C:\Program Files\Autodesk\MayaBonusTools2013\python\userSetup.py
```

to your .\maya\2013\scripts\ -or- .\maya\2013-x64\scripts\ folder.

**Note:** Change the paths accordingly for Mac or Linux.

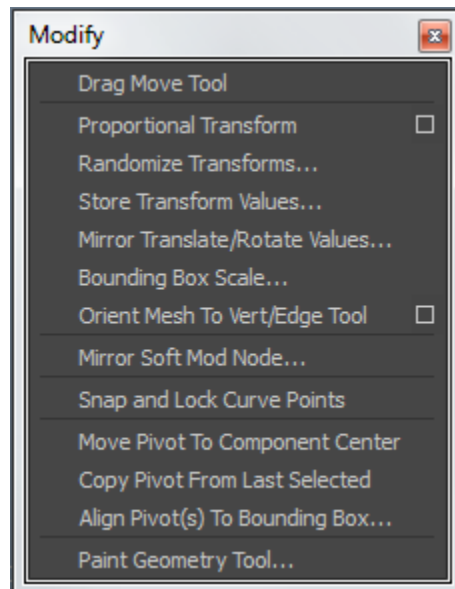
## Plug-ins

Bonus Tools contains a number of plug-ins. Any tools that require one of these plug-ins will be greyed out in the menus by default and therefore unusable.



In order to use any of these tools you must first load the associated plug-in from the Plug-in Manager. Set any of the Bonus Tools plug-ins that you wish to use in the future to auto load. You will have to restart Maya in order for any newly loaded plug-ins to be available from the Bonus Tools menu.

## Modify



### Drag Move Tool (New)

This tool can be used to interactively place and drag an object or multiple objects along a virtual ground plane. Simply activate the tool, and then click drag in the viewport to move the selected object(s) around on the current XZ plane. CTRL click to drag vertically along Y. The Y value of the object(s) will determine the virtual ground plane. The tool can also be used to quickly place object at an location from the Top camera view.

To use, select one or more objects/transforms, activate the Drag Move Tools, and then click/drag in any viewport.

### Proportional Transform (Updated)

This tool will transform selected objects in a proportional manner. A percentage value is specified to define how much each object will be affected based on their current values as well as a pivot location. You can Translate, Rotate or Scale and have the offset proportionally affect each object based on either the last objects pivot or a user defined pivot location.

In the most recent release a number of bugs were fixed including the ability to isolate proportional scale to a specific axis which did not work before. An option for using the first selected object as the pivots location was also added. Lastly the default settings were updated to be more useful.

To use, select the object you wish to transform and open the **Proportional Transform Window**.

### Randomize Transforms

Randomizer lets you interactively apply random values to selected objects, components and channels.

**Note:** This is a python based tool and may not work after default installation. See installation instructions on setting up your python path if you want to use this tool.

To use, select some objects and start the Randomizer. (or open Randomizer, then select objects and click on Reload Sel.) A window will open with sections for:

Objects, Channels, Components, Selection

**Objects:** Simple, easy to use randomization for translate, rotate and scale.

- Move the **Range** slider to apply random settings (might be slow for large >500 number of objects).
- Amplify or reduce the randomization by using **Multiply XYZ**.
- Use Maya's Move/Rotate/Scale tool to apply offsets.

There is no **Apply** button. Click on **Reset** to remove all randomization.

To keep the current settings simply close the Randomizer window or click on **Reload Sel**. Settings will be applied and all values in the Randomizer window will be reset. The current selection gets loaded.

**Channels:**

- To randomize single channels, select the channels in the Channel Box and click on **Reload Sel** in the Randomizer window.
- Use **Offset** to apply an offset.
- Set **Step** to apply the random numbers in steps (**Offset** is independent from **Step**).

**Components:** Select vertices and click on **Reload Sel**.

- Apply a **Translate Range** and **Scale Axis** as in the **Objects** section. All vertices move independently.
- Use **Dnoise** to apply a 3D fractal function as random translation. The **Scale Dnoise** sets the scale of the Dnoise fractal.
- Note: The **Along Normal** setting is currently not working.

**Selection:** Use the **Selection Ratio** slider to select a ratio of the loaded selection. Note: The ratio is only the probability that an object gets selected. There is no guaranty that the ratio is met.

**Buttons:**

- **New Seed:** Creates a new seed of random numbers. Use this button if you don't like the current randomness.
- **Reload Sel:** Leaves all objects where they are, reloads the current selection, and resets all values in the Randomizer window.
- **Reset:** Resets all values in the Randomizer window to default. Selected (loaded) objects will reset to their initial settings.

Undo: Avoid to using Undo while the Randomizer window is open. An Undo step is set whenever a slider is released.

## Store Transform Values (Updated)

This tool will allow you to save the current values for the selected object(s) as a shelf button that can be used later to reset to object(s) to those stored values. This is similar in concept to a preset. There is also an option to include hierarchies.

In the latest update shape nodes are now supported for things such as cameras and lights

To use, select one or more objects and open **Store Transform Values**. Then press either the store selected or store hierarchy button in order to create a shelf button on the current/active shelf. You can also choose the name of the button before creating it.

## Mirror Translate/Rotate Values (New)

This tool will invert/mirror the Translate and/or Rotate values on all selected objects across a chosen axis.

To use, select one or more transforms and open **Mirror Translate/Rotate Values**. Choose the transforms to mirror as well as the axis (x, y, z) and then apply.

## Bounding Box Scale Window

This window allows you to scale an object based on its bounding box size. The scale pivot of the object can be easily set to the minimum or maximum X/Y/Z position of the bounding box. This essentially allows you to scale an object independent of the actual scale values.

To use, select an object to scale and open the **Bounding Box Scale Window...**

## Orient to Vert/Edge Tool

This tool orients one mesh to another mesh by aligning a vertex from the first object to a vertex or an edge on the second object. The orientation can take place around any single axis: X, Y or Z and can occur in Object or World space.

To use, activate the **Orient To Vert/Edge Tool**, set the “orient to” mode in the options to either edge or vert. If edge is selected then you will click on a source vert from the first object and a target edge on the second object. If vert is selected you will click on a source vert from the first object and a target vert on the second object. The result will be a rotational alignment of the first objects to the second. The location of the pivot will also affect the rotation.

## Mirror Soft Mod Node

This tool will duplicate and mirror an existing soft mod node across a mesh in either object space or world space and along any axis. This allows you to symmetrically apply a soft modification node to something like a character’s face or body. Note: This is meant to work with a Soft Mod **-Node-** not a soft transform.

To use, select an existing Soft Modification Node and open the **Mirror Soft Mod Node** window.

## Snap and Lock Curve Points

Formerly known as “Curve Intersection Lock Node” this tool locks two curve points or two curve edit points with a locator. After the points are locked, the locator can be moved to change the shape of the curves. If the curves are moved the locator will pin the target points and keep them in place.

To use, select a combination of curve points or edit points and then apply **Snap and Lock Curve Points**

## Move Object Pivot to Component Center

This tool will move the object's pivot point at the center of the selected component(s).

To use, select one or more polygon components and apply **Move Object Pivot To Component Center**.

## Copy Pivot from Last Selected (New)

This tool will copy the pivot of the last selected object/transform and then paste it to all other selected objects/transforms. The result will be that all pivots of the selected object will be in the same location.

To use, select one or more transforms and apply **Copy Pivot From Last Selected**.

## Align Pivot(s) to Bounding Box (New)

This tool will align the pivots of all selected objects to the bounding box of either each object individually, or to the bounding box of all objects combined. The center pivot first option will put the pivot at the center of the bounding box before setting it to the min/max of the chosen axis. Leaving this option off will cause the pivot to line up relative to its previous location instead.

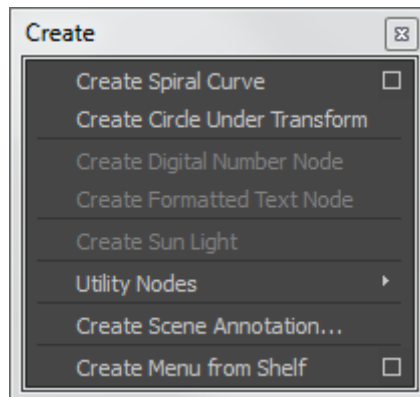
To use, select one or more transforms and apply **Align Pivot(s) to Bounding Box**.

## Paint Geometry Tool

This tool allows you to place objects onto other objects through the familiar artisan interface.

To use, select the object that you would like to paint on activate the **Paint Geometry Tool**. A window will pop up that allows you define the object to use as a source as well various control for the placement on the target.

## Create



### Create Spiral Curve

This creates a curve in the shape of a spring. The option box provides control over the height, radius and number of turns. Number of turns can be a negative number to have the twist in a different direction.

To use open **Create Spiral Curve** options and apply.

### Create Circle Under Transform

This tool adds a NURBS circle under a selected transform node. This is useful for creating/adding controls to a character rig. Refer to the MEL script for details on using a custom shape.

To use, select a transform and then apply **Create Circle Under Transform**.

### Create Digital Number Node

This tool creates polygonal geometry in the shape of a digital readout for displaying values in the viewport

To use, run **Create Digital Number Node**. Select the PolyReadout node and then find the polyDigits node in the input section of the ChannelBox. This node will contain the various attributes for refining the look of the numbers.

**Note:** This requires the PolyTools.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

### Create Formatted Text Node

Create a node that converts input values into various formats (e.g. date or timecode) which display in the viewport as 3d text and displays in the viewport as 3d text

To use, run **Create Formatted Text Node**. By default the node will have the current frame number as it's input, but any other value can be hooked up to the node by making a new connection to its input in the hyperGraph.

**Note:** This requires the stringFormatNode.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

## Create Sun Light

This creates a light that behaves like the sun. This is basically a directional light with additional controls. It allows the user to control attributes such as latitude, longitude, day of year and time in order to simulate the sun.

To use, run Create Sun Light Node. Select the light and look for the sunDirection node in the inputs of the ChannelBox. This node contains the various sun controls.

**Note:** This requires the sun.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager

## Utility Nodes -> Closest Point On Curve Node

This plug-in defines both a MEL command and a DG node which takes in as input, a NURBS curve and a world space position, then computes the closest point on the input curve from the input position. In addition to the world space "position" at the closest point on the curve, also returned are the "normal", "tangent", "U-parameter" and "closest distance from the input position", at the closest point on the curve.

**Note:** This requires the closestPointOnCurve.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

Extended documentation for this tool can be found in the Bonus Tools install location ->

`.\MayaBonusTools2013\docs\closestPointOnCurve.txt`

## Utility Nodes -> Create Point On Mesh Info Node

This plug-in defines both a MEL command and a DG node which computes the world space position and normal on a poly mesh given a face index, a U-parameter and a V-parameter as input. This command returns information for a point on a poly mesh, in particular its world space "position" and/or "normal" at a given input face index, U-parameter and V-parameter.

**Note:** This requires the pointOnMeshInfo.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

Extended documentation for this tool can be found in the Bonus Tools install location ->

`.\MayaBonusTools2013\docs\ pointOnMeshInfo.txt`

## Utility Nodes -> Create Audio Wave Node

This is a command to create a node which will output the amplitude of a sound node.  
To use:



- Load a sound file into Maya.
- Bonus Tools -> **Create Audio Wave Node**
- Enter one of the following MEL commands:
  - `setAttr audioWave1.audio -type "string" "soundfile";`
  - `connectAttr soundNode.filename audioWave1.audio;`
- Enter the following MEL command:
  - `connectAttr time1.outTime audioWave1.input;`
- Enter the following MEL command:
  - `connectAttr audioWave1.output object.attribute;`

The audioWave node has two attributes which let you scale the sampled amplitude:

- `sample` - this attribute specifies how many sound samples to average to compute amplitude ... the bigger this number is the longer it will take for a drastic change in amplitude to be detected
- `scale` - this attribute is a scaling factor for the resulting amplitude with a scale of 1.0 the amplitude will fall within a range of -1 to +1

## Create Scene Annotation (Updated)

This tool originally came from layoutTools but has now been separated out as a bonusTool. The purpose is for creating scene annotations/notes that will save with a given scene and will be displayed again when the Scene is opened. This can be useful for sharing information and details about a given scene between multiple people or simply reminding yourself about something the next time you work with the scene again.

A warning dialog box has been added to prevent accidental deletion of existing Scene Annotation Nodes.

To use open **Create Scene Annotation**, enter text into the main field and use file menu to save.

## Create Menu from Shelf (Updated)

This tool will convert a user specified shelf into a pull-down menu that will be added at the end of the top Main Menu. The menu will only exist during the current Maya session but will disappear if Maya is restarted.

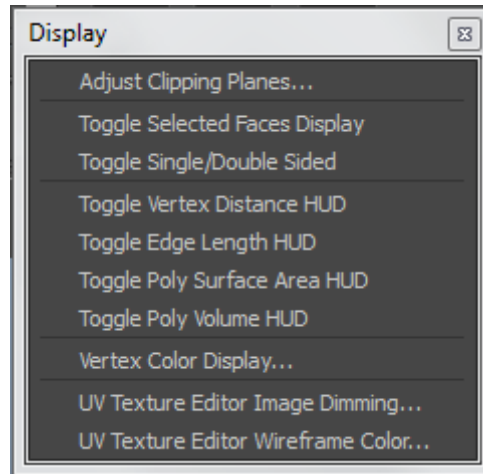
Optionally, the menu can be written to a MEL file that can be reused. When writing the file to disk, the menu can later be added to the userSetup.mel file so that it is will always be available at start-up. The UI/menu name will always be of the form `main_ShelfName_Menu` and the saved file will be called `ShelfName_Menu.mel` and will be save in you user scripts folder.

The save feature was previously broken but has been fixed in this release. However it should be noted that the resulting .mel file will only work for shelves (i.e. shelf buttons) containing standard commands and/or procedure names. Shelves containing entire scripts will likely cause errors in the resulting MEL file that may be difficult to track down.

To use open the **Create Menu from Shelf** options and type in the name of the shelf that you would like to convert into a menu. The default is custom but any shelf can be chosen. You will need to make sure that the desired/named shelf is also the currently active shelf.

To delete a menu you will need to use the `deleteUI` command or simply restart Maya. If you created a menu called `MyTestShelf`, you would execute this MEL command -> `deleteUI main_MyTestShelf_Menu;`

## Display



### Adjust Clipping Planes

This tool provides a simple window with slider that will dynamically update the near and far clipping planes for whichever view is active. Note: A panel with a camera must be active in order to open the window.

To use, click in any camera view in order to make the panel active. Then run **Adjust Clipping Planes** and adjust sliders to change that camera's clipping planes interactively.

### Toggle Selected Faces Display

This tool will show or hide selected polygon faces and/or objects. A Heads-up Display button will be created in the viewport panels that will allow you to either hide additional faces or show any faces that are hidden. This essentially works in the opposite manner as the standard isolate select.

To use, select some faces and/or objects and run **Toggle Selected Faces Display**. They will be hidden in all viewport panels. After running once a Heads Up Display will be created that can be used for additional hiding/showing.

### Toggle Single/Double Sided (Updated)

This will toggle the single/double sided flag of all selected objects. To use, select an object and apply **Toggle Single/Double Sided**.

Now, if one or more mesh is selected it will only toggle for those meshes. If nothing is selected it will toggle display for all meshes in the scene.

## Toggle Vertex Distance HUD

This item will add Heads Up Display to show the distance between two selected poly vertices. The menu item is a toggle. To use, run **Toggle Vertex Distance HUD** to turn it on. The HUD value will dynamically update any time you select two vertices.

## Toggle Edge Length HUD

This item will add Heads Up Display to show the length of a selected poly edge. If more than one edge is selected it will calculate the total length of all of the selected edges. The menu item is a toggle. To use, run **Toggle Edge Length HUD** to turn it on. The HUD value will dynamically update any time you select one or more edges.

## Toggle Poly Surface Area HUD (New)

This item will add Heads Up Display to show the total surface area of the selected mesh. If more than one mesh is selected it will calculate the combined total. The menu item is a toggle. To use, run **Toggle Poly Surface Area HUD** to turn it on. The HUD value will dynamically update any time you select one or more edges.

This was previously just a command that printed in the output window but been converted to a dynamic HUD.

**Note:** This requires the measure.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

## Toggle Poly Volume HUD (New)

This item will add Heads Up Display to show the total volume of the selected mesh. If more than one mesh is selected it will calculate the combined total. The menu item is a toggle. To use, run **Toggle Poly Volume HUD** to turn it on. The HUD value will dynamically update any time you select one or more edges.

This was previously just a command that printed in the output window but been converted to a dynamic HUD.

**Note:** This requires the measure.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

## Vertex Color Display

This will open a window for controlling the display of vertex colors is all viewport panels at once. This includes options for cpv only, textures, and lights. Settings will be applied to a selected mesh if one is selected, or all meshes in the scene if nothing is selected.

To use, open **Vertex Color Display** and choose the desired display mode.

## UV Texture Editor Image Dimming

This is a window to dim the texture displayed in the texture editor for easier viewing of UVs while editing.

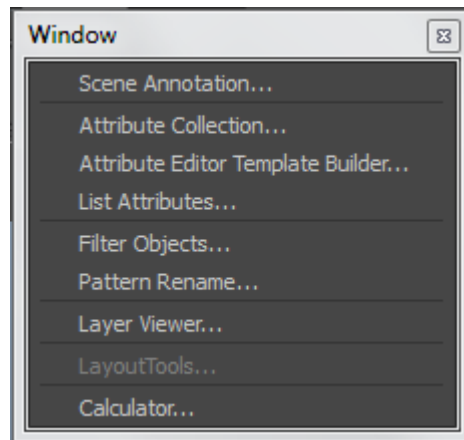
To use, open **UV Texture Editor Image Dimming** and adjust slider accordingly

## UV Texture Editor Wireframe Color

This is a window to change the wireframe color viewed texture editor for all meshes. This can sometimes allow for easier viewing of UVs while editing. Note: it will only effect the wireframe in the texture editor and not in the 3D views.

To use, select a mesh, then open **UV Texture Editor Wireframe Color** and choose desired color.

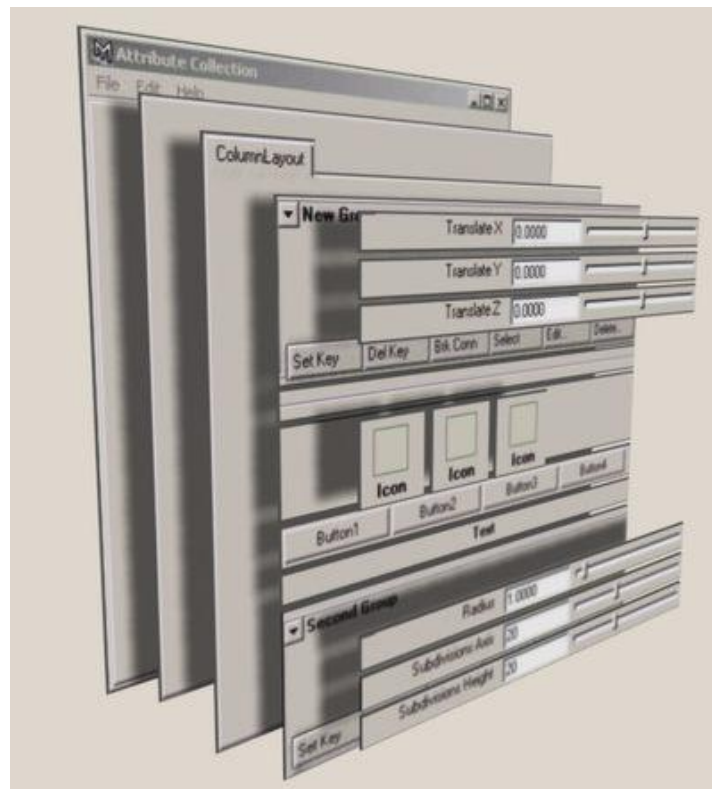
## Window



### Scene Annotation

See **Create** section for details on how to use this tool. If a scene annotation already exists, this will simply open that annotation.

### Attribute Collection V2.04



**Attribute Collection** is a Maya script that helps you create your own user interface (UI). It lets you select channels (attributes) in the **Channel Box** and creates fields and sliders for these channels in a new panel or window.

You can then interactively:

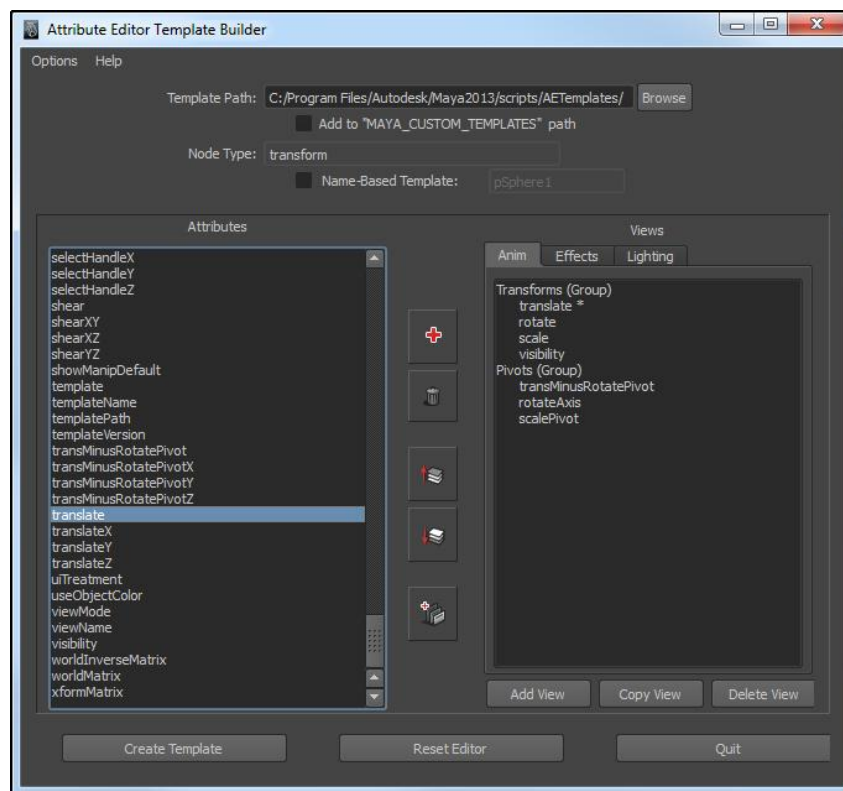
- sort, rename, regroup and delete fields/sliders
- set min/max values for sliders
- insert UI elements like separators, buttons, icons, text, etc.
- use these fields/sliders/buttons to easily adjust and keyframe your objects
- save the UI with the scene... when you load that scene the UI will open automatically.

---

Extended documentation for this tool can be found in the Bonus Tools install location ->

.\MayaBonusTools2013\docs\attributeCollection\_2.03

## Attribute Editor Template Builder (New)



**Introduction** - There is a new feature available in Maya 2013 that may change how you use the Attribute Editor. With Custom Attribute Editor Attribute Views, you may use template files to customize the Attribute Editor for specific tasks, projects or artist type. Some things you can do with custom Attribute Views in Maya are:

- Create custom views of attributes in the Attribute Editor.
- Specify views for both Node Types and for specifically Named Nodes,
- Set views for the current selection, or Globally for all nodes in Maya
- Use Custom Callbacks in Python and Mel to inject UI or Actual Script Functions into the AE
- Set Maya to search for Templates in a custom director or across a network

There are 5 short video tutorials to get you going on View creation with the Template Builder. The Quickstart movie will get you off and running, but the other videos will open you up to the powerful potential of Attribute Editor views. These movies will be posted on the -> [Bonus Tools Resource Page](#)

Note that Pop-Up help is available for the Button in the Template Builder UI.

**Basic Operation** - To start the UI you either need to have a node selected that is of the type you want to create a template for before initiating the Template Builder, or you can select a node press the Reset Editor button to re-initiate the UI.

Several items in the Template Builder are automatically filled in, such as the Template Save path and the Node Type you will be creating a template for. The Attributes list will also fill in with a list of all the attributes for the selected node, and the Views list will contain three empty start-up views – Anim, Effects and Lighting.

**Building Basic Node Type Views** - Building views is a very simple process. Merely select attributes in the Attributes list, and press the “+” button to add them to the current view. You can remove attributes from the current view by selecting the attribute(s) in current Views list and press the “Garbage Can” button to remove them from the current view.

With the “Move Up” and “Move Down” buttons you can shift attributes up or down in the current view. The order in which they are displayed in the Template Builder UI is how they will show up in the Attribute Editor when that view is displayed.

To add an Attribute Group for the purpose of visual organization, simply press the “Add Attribute Group” button (the bottom button in the list). You will be prompted for a name. An Attribute Group with the name you enter will be added to the current view.

You can use the other buttons to delete the Attribute Group or move it up and down.

**Managing Views** - You can navigate through your views by clicking on the appropriate tab in the Views area of the UI. To add an empty view to the list, press the “Add View” button. You will be prompted for a name, after which a tab will appear with the name you entered. The name maybe slightly different than the one you typed. View names must start with letters and can only consist of letters or numbers. If you enter an invalid name, the name will be made “View Name” compliant, and then the tab will appear.

The “Copy View” button will duplicate the current view as a new view with the name you provide. This is a quick way to use other views as the basis for others. For example, if you want the Anim and Effects views to be similar, you create your Anim view, delete the empty Effects view, and then “Copy” the Anim view as Effects.

“Delete View” will delete the current view from the UI. If you delete a view, anything unsaved will not be recoverably.

**Saving Views** - To save the views that are currently in the Template Builder, press the “Create Template” button. A window will pop up letting you know where the template was saved to. This path will also be echoed to the Maya Script Editor History area for easy cut and paste operations.

The template file will be saved to the path listed in the Template Path line at the top of the Template Builder UI. By default, they UI will come up with the standard Maya Program/scripts/ AETemplates directory. By saving them here the templates will be immediately available for use.

If you browse to a different directory to save your templates, you may want to check the “Add to MAYA\_CUSTOM\_TEMPLATES path” checkbox to ensure that the template will be available immediately saving. Note that the next time you start Maya the MAYA\_CUSTOM\_TEMPLATES path will be reset to being empty unless custom scripts are used to set the MAYA\_CUSTOM\_TEMPLATES path Environment variable.

You may also note that you may need to run a “refreshCustomTemplate” command. If you are authoring a template for a node or node type that has no pre-existing Attribute Editor Attribute Views there is no need to refresh the template. If, however, a template file exists for a node and a custom view has been used in your current Maya session, you will need to refresh the view in order to see your changes.

To refresh the Template for a node, display a custom view of that node in the Attribute Editor (If the current view is set to the default view a refresh will not occur). From the Maya Script Editor, Command Line or Shelf Button, run the command “refreshCustomTemplate;” and the new template file for that node will be used by the Attribute Editor.

**Advanced Templates: Callbacks** are a power feature providing a way of injecting custom UI into the Attribute Editor, as well as allowing you to link MEL or Python code to attributes. You can learn more about setting up callbacks in the Maya documentation.

To apply a Callback, highlight the Attribute(s) in the current view and click the Right Mouse button. From the menu that pops up choose the “Add Callback” item. A small window will come up prompting you for the Callback command. If you are creating a python-based callback command you must include the initial “py.” for the callback to work.

After you enter your command, an asterisk (\*) will be added to end of the attribute in the list to let you know that a callback exists for this attribute. Use the other Right Mouse Menu items to list callbacks in the current view or in all views.

**Advanced Templates: Node Named / Object-Based Views** - View templates can be saved for either Node Types, or for uniquely named nodes of a specific type. For example, Transform nodes can have a set of views, while the Transform node named “Supermover” can have a completely unique set of views.

To create Named Node views, click the “Name-Based Template” checkbox underneath the Node Name text field. This will activate the Node Name field. It will default to the name of the node that was selected when you populated the UI, but once it is activated you may enter any name you would like.

Now, when you press the “Create Template” button, a template will be saved that will work for nodes of the current Node Type listed in the UI that are have the name entered in the Node Name text field.



## List Attributes

This item lists all attributes for the selected object in a single scrollable column and provides information about the type of each attribute.

To use, select an object open **List Attributes**. The window will update dynamically if a new object is selected.

## Filter Objects

This opens a window which will filter and select objects in the scene. You can either filter by node type (e.g. locator or spotlight) or you can filter by classification (e.g. geometry, lights or shapes.) After you select a certain filter in the left hand column it will search the scene for nodes or objects of that type and list them in the right column. You can also select, delete and create sets for the nodes/objects that are listed.

To use, open the **Filter Objects Window** and choose the filter type in the menu.

## Pattern Rename

Pattern Rename is a renaming tool that is useful for renaming extremely long object names that contain many equal patterns (for example imports from CAD systems).

The script lets you enter a number of search strings (expressions) and optional replace strings and shows the resulting object names in a preview list.

The window of Pattern Rename has an input section (**Max Iterations, Prefix, Search, Replace**), a list of **Search and Replace Strings** with an **Add** and **Remove** button and a list of **Resulting Names**. At the bottom of the window you find buttons for **Rename, Reload, Refresh** and **Close**.

Usage: To start, select a bunch of objects (preferably with long names and many patterns in them) and click on **Reload**. The object names are then listed in the **Resulting Names** list.

Find a pattern in the names that you want to remove/replace and type that pattern into the **Search** field. (optional: enter a **Replace** string).

Hit Enter or advance to the next input field to update the list of **Resulting Names**. This shows now a preview of resulting names.

To store/register your search/replace expression click on Add. This will add your entry to the list.

(NOTE: the **Search** string is a regular expression. Please refer to the documentation of the MEL command “match” for a description of the syntax of regular expressions)

To edit an expression in the list, simply click on it, make your changes in the input fields and click on Add to store your changes.

**IMPORTANT:** Only those entries that appear in the list of **Search and Replace Strings** will be used for the final rename. Temporary (unsaved) entries in the input fields will NOT be used for the final rename.

To remove expressions simply select them and hit the **Remove** button (no undo here).

**Prefix** simply adds a prefix to all object names.

**Max Iterations** stops the replace loop after the number of iterations to prevent endless renaming (e.g. rename "Hello" with "HelloPLUS" and do that again/again/again...). If **Max Iterations** is set to 1 then only one occurrence of all search expressions gets replaced.

Sometimes the script warns you that the resulting names are invalid because they contain spaces or have a number at the beginning. Make sure that the names are ok before you click on the **Rename** button, otherwise the rename will produce errors.

The **Rename** button will rename all objects that were loaded into the **Resulting Names** list.

Only those objects that you have loaded with **Reload** or that were selected when you opened the window are in the list. At any time you can change your selection and **Reload** it (e.g. load only a small number of objects for testing, then load the final selection right before you click on **Rename**).

## Layer Viewer

This is a floating layer editor with a viewport attached to it. The layers are displayed in an Outliner view so that they can be selected directly from the window. Once a layer is selected the contents of that layer will automatically be isolated and framed in the viewer window. The individual items in a given layer can also be isolated by expanding the layer in the Outliner. The List All Layers button will then expose all layers allowing you to isolate a different layer. There are additional controls along the top for editing the selected layer and changing various display settings.

Note: Many fixes and improvements have been made to the updated Layer Viewer, however the bookmarking feature was removed for stability reasons.

To use, open a scene with layers and launch the Layer Viewer Window.

## LayoutTools

LayoutTools originally designed for game level assembly. Over time however it became apparent that these tools were being used by many people outside of the games industry for basic layout and assembly of objects within a scene (e.g. assembling sets, blocking out architectural spaces, populating environments with objects, etc...) It was also evident that many Mac users required similar functionality, but the previous versions did not support Maya on the Mac. Therefore LayoutTools2011 has been updated for Mac compatibility.

**LayoutTools** provides new functionality and also consolidates many of Maya's existing features into one streamlined, easy to use interface. The interface itself is broken down into 3 main sections: **Layout, Placement, Assembly and Import**.

The **Import** section provides a simple icon based UI, which allows you to quickly and easily populate a scene with objects from other files. **LayoutTools** will search a user defined location for "importable" files and automatically builds icon buttons for each file it finds. By simply clicking on an icon, the associated file can be

imported or referenced into the scene. The imported object can then be easily positioned by clicking in the viewport and simply dragging it into place.

The **Placement** section contains tools for adjusting the position, rotation and scale of objects within a scene. This includes the ability to control the relative offset of objects in various ways, including randomization.

The **Assembly** section contains a collection of tools for the alignment and snapping of objects within a scene. Standard Maya features such as the **AlignTool** and the **SnapTogetherTool** are integrated, as well as new tools such as **Target Snapping**, **Object Replicating** and the **OrientToTool**.

The **Display** section provides controls for setting and adjusting the visual aspects of your scene and the objects within it. This includes tools for navigating through your scene such as the **WalkCamera** and utilities for storing information in your scene such as the **FileAnnotation** feature. It also contains simple controls for things such as view modes, panel settings, geometry attributes, and vertex color display just to name a few.

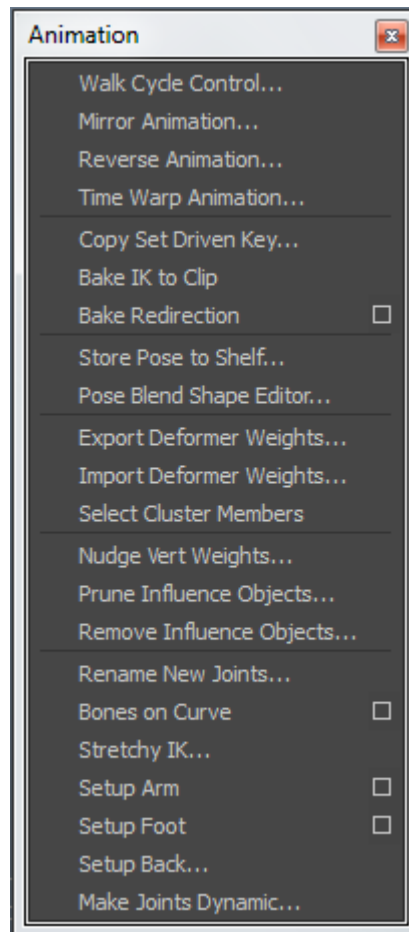
**Note:** LayoutTools requires a separate installer which can be found on the [The Area](#) . Or simply do a Google search for Maya LayoutTools.

## Calculator

This opens a simple calculator. The One Liner button allows for an expression to be entered in the field and then calculated.

To use, simply open the Calculator window and either enter numbers with keypad or by clicking.

## Animation



### Walk Cycle Control

This is a window to set up character controls and then key them for walk cycles. To be clear, these walk cycles are as if the character is on a treadmill. The character should be symmetrical across the X axis.

When a key is set for one side, a key is set for the opposite side at the opposite keyframe.

- a 24 frame cycle
- frame 5 is active
- user keys left foot (from the control window), left foot is actually the left foot and the left knee
- control window keys the right foot in the same position at frame 17 (current frame + cycle offset)

**Note:** The order of controls in the control window is important as it determines the symmetrical relationships (i.e. mapping)

- Left Foot set to Left Foot and Left Knee
- Right Foot set to Right Knee and Right Foot

- This will be a problem as the Left Foot is being mapped to the Right Knee

## Mirror Animation

This tool allows you to take an existing animation and mirror it along a given axis. For example, if you have a character that is walking from left to right, and you want the identical walk from right to left. This script can be used to invert the animation. This script addresses two different situations where you would want to mirror/invert animation on a character.

- **Between:** Swapping animation from the left side to the right side or vice versa (eg... IK handles, constraints for hands and feet, shoulder and elbow joints). This requires swapping all anim curves from side to side, as well as inverting certain curves based on the axis you want to mirror across. In this case you would select one pair at a time and then apply the mirror. For an entire character you would need to select each pair that required mirroring (eg... hands, elbows, feet, knees, etc...)
- **Individual:** Mirroring animation on single joints/controls (eg... backs, neck, tails). This only requires inverting certain curves based on the plane you want to mirror across. For example, mirroring along the YZ plane requires inverting the X translate channel as well as the Y and Z rotate channels. In this case you could select all center joints/controls and mirror them simultaneously, or you could do them one at a time.  
By default the tool will mirror Translate, Rotate and Scale, but you can also choose to mirror only selected transforms.
- **Custom Attributes:** This allows you to also include user defined attributes such as Set Driven Key. This is on by default. If a user defined attribute exists on one side but not the other then it will be ignored.
- **Ignore Locked Attributes:** This allows you to skip over any attributes that have been locked from the channel box. This is on by default.

**Note:** the local axis is used, so be sure to check orientation of joints before setting the mirror plane if you are unsure which direction to mirror.

## Reverse Animation

This tool reverses all animation curves for selected objects (including hierarchies). You can reverse around specific frame, the mid-point, start or end of the animation.

For something like a mocap skeleton simply select the root transform and apply. For something like rig, you must select all node(s) containing controls.

To use: Select an animated object or node, open **Reverse Animation** window and apply with desired settings.

## Time Warp Animation (Updated)

This tool will create a new time warp curve for either the selected objects or a group of objects. Unlike a scene time warp, which affects everything in the scene, this can be used to only time warp certain objects, or to time warp different objects with different time warp curves. There is an additional option to attach an existing time warp curve to a new object. The tool assumes that the objects you wish to time warp already have animation curves.

If you want to effect an entire group of objects choose the Include Hierarchy option. This option will also allow you to time warp shape nodes (e.g. a light transform plus the lighting values).

If you want to connect an existing time warp curve you must first select the objects that you want to effect, and then select the existing time warp curve (node) last before applying. Note: It may be easiest to select the existing time warp curve (node) from the HyperGraph.

This tool has been updated so that the resulting time warp curve will be setup similarly to a new scene time warp curve. As with a scene time warp, the initial curve will be set to linear and the start/end values will be defined by the current time range.

To use, select the objects that you'd like to time warp and open the **Time Warp Animation** window.

## Store Pose to Shelf (Updated)

This tool records a given pose for a character by creating a shelf button and icon on the current (top) shelf. This button contains all of the necessary setAttrs for getting back to a particular pose. It will work on either hierarchies (default) or selected nodes. You can create as many poses/buttons as you need. This pose is not to be confused with Trax Poses. There is no association between these poses and Maya's CharacterSets.

To store a pose for an entire character, select the parent node(s) of anything related to the character (Root Joint, IK, constraints, locators, etc...) If everything is parented under one node, simple select that node. Then just open Store Pose to Shelf, name the button and apply using hierarchy mode. To return to the stored pose, simply click the shelf button.

This tool does some basic error checking, including checks for attributes that are un-writable or locked. (e.g. EndEffectors or IK handles that are constrained or driven by another object)

In the latest update shape nodes are now supported for things such as cameras and lights

Note: **Store Pose to Shelf** is technically the same tool as the BonusTool Modify->**Store Transform Values**

## Copy Set Driven Key

Copies set driven keys from one channel to another.

**Set Driver Key Source:** This is the channel to copy the Set Driven Key from.

**New Destination Driver:** This is the new driver for the target channel (New Destination Driven).

**New Destination Driver:** This is the channel to copy the Set Driven Key to.

To use, open **Copy Set Driven Key**.... then load the required objects and press Copy.

## Bake IK to Clip

This item creates a clip for a selected IK handle provided that the IK handle is affecting joints that belong to the active character set and there is an active clip for the active character set. This is useful when editing clips. An existing clip can be modified with an IK handle; for example, extending a character's kick for more convincing motion.

After the clip has been created, it can be merged back into the main character set by merging character sets (select the character and sub-character and Character->Merge Character Sets) and then merging the clips (select the clips and Edit->Merge).

The bake range of the IK Handle is taken from the active time range.

To use, select the IK handle and apply **Bake IK to Clip**.

## Bake Redirection

This will bake the effect of the redirection node on the selected object(s).

To use, select object being affected by redirection and open **Bake Redirection**

## Pose Blend Shape Editor (New)

This editor creates and manages corrective blend shapes for skinned meshes. In order to use this tool you must start with a mesh that has already been skinned to an existing skeleton.

When creating a new Pose Blend Shape, a new mesh will be. It will essentially be a copy of the original mesh. It will also inherit the same skin weighting. A random color shader will be applied to the new mesh as well as an annotation to help you easily identify it. The original mesh will be temporarily hidden.

You can now use standard Maya tools to modify the shape of this pose mesh (e.g. soft select, sculpt, etc...) This will indirectly affect the original mesh but only at the current pose for the driving joint. So if you edit the shape of the pose mesh, then show the original mesh, and then rotate the driving joint either directly or via a control rig you will see the effect of the blend shape ease in and out as you rotate the joint into and out of that pose. The blend shape effect will always be relative to the bind pose of the original mesh.

To use...

1. Start with mesh/skeleton in the bind pose
2. Rotate the joint that you want to use as the shape driver into the target pose (e.g. bend elbow)
3. Select deforming mesh that you want to create a pose blend shape for (e.g. body mesh)
4. Select the joint that you want to drive the pose blend shape (e.g. elbow)
5. Click the Create New Pose Blend Shape button and name it accordingly (e.g. ElbowPoseBlend)
6. Edit the resulting new mesh accordingly (e.g. create bulge in bicep area)
7. Click Show original mesh in the editor
8. Rotate driving joint between original pose and target pose (e.g. bend elbow)
9. Result should be a bulging bicep as the elbow straightens and bends

The editor has options for showing, hiding and deleting all pose blend shapes for a given mesh. If a new mesh is selected the Update button may need to be used to refresh the list in the UI. You can also access the Blend Shape node from this editor.

Note: The curve that defines the blend shape is simply a set driven key and can be adjusted in the graph editor to control when and how the blend shape gets applied.

## Export/Import Deformer Weights

Export/Import weight data from a deformer to a simple XML format.

To use, select an object being affected by a deformer and open **Export or Import Deformer Weights**. A list of available deformers will be shown. Choose the deformer and export/import the weights.

## Select Cluster Members

This tool will select the components of the active cluster.

To use, select a cluster and apply **Select Cluster Members**.

## Nudge Vert Weights

This tool opens a window to adjust vertex weights for a selected influence object by a user defined amount.

To use, select a vert and an influence object open the **Nudge Vert Weights** Window. Enter a nudge value and press the button to move the weight up or down.

## Prune Influence Objects

This item will allow the user to set smooth skin weighting to 0 based on a number of influence objects. This is an alternative to Skin->Edit Smooth Skin->Prune Small Weights which does not provide a mechanism for pruning to a number of influence objects.

Prune below is included as a convenience and works the same as in the Prune Small Weights tool.

To use, select a skinned mesh and open the **Prune Influence Objects** window. Maximum Influences is the number of joints (or influence objects) affecting the skin. Press Prune Influences to reweight the skin.

Note that this script is not undoable - undo is turned off to improve performance which can be slow with this command.

## Remove Influence Objects

This item allows for selective removal of influence objects from a smooth skin. Use this for a multi mesh character to remove specific influence objects. When you smooth skin multiple meshes, every mesh is attached to every bone in the skeleton. This can slow performance and complicate skin editing.

This is similar to Skin->Edit Smooth Skin->Remove Unused Influence Objects but it will let you selectively remove influence objects. If the character's head is a separate piece of geometry, the feet should not deform it so they can be removed as influence objects. The neck or shoulder joints may not be initially affecting the head mesh but they may be required to so they may be retained initially as influence objects.

To use, select the skinned geometry and open **Remove Influence Objects**. A window will open. With the geometry selected, press Load New Skin. The window will show all the influence objects for the selected geometry. Highlight the influence to remove and press Remove Influence.



Only one influence can be removed at a time.

## Rename New Joints

This item will create a window to allow for automatic renaming of the selected object. This was created to quickly and easily rename joints in a skeleton. When creating a spine, the user generally wants the joints named spine instead of joint. It's also good for fingers.

This does not have to be limited to joints. Any item that is selected will be renamed so it could be useful for level building activities.

To use, open **Rename New Joints**. Enter a name to rename the joints to and start placing joints (or objects). The window provides an on/off toggle at the top so that the renaming can be easily interrupted.

## Bones on Curve

This tool will place a user specified number of bones on a curve with the option to rebuild the curve and add spline IK to the joints. When rebuilding the curve, the degree is changed to 2.

To use, select a curve, choose number of bones in **Bones on Curve** window, then apply.

## Stretchy IK

This tool makes the selected IK handle's chain stretchy. It requires the user to specify the axis that points down the bones in the chain.

To use, select an IK handle, choose axis and apply Stretchy IK.

## Setup Arm

This sets up an arm.

To use, select the shoulder joint, followed by the wrist joint and apply **Setup Arm** with the setting below. The tool will add the appropriate controls. When finished, the Prefix Hierarchy option box will open so that the nodes may be named.

**Twist Joint:** This specifies whether there is a twist joint in the fore arm.

**Hand Control:** A user specified hand control node may be created. Place it in the desired position relative to the skeleton. If left blank, a selection handle will be used.

**Elbow Control:** A user specified elbow control node may be created. Place it in the desired position relative to the skeleton. If left blank, a locator will be used.

**Note:** This assumes that the leg is built in the side window with the foot pointing in +Z axis.

## Setup Foot

This tool sets up a leg and the attached foot.

To use, select the hip joint, followed by the ankle joint and apply **Setup Foot** with the settings below. The tool will select the ankle, ball and toe and add the appropriate controls. When finished, the Prefix Hierarchy option box will open so that the nodes may be named.

**Heel Joint:** This specifies whether the leg hierarchy has a heel joint between the ankle and ball joint.

### Foot Style:

**IK Handles:** This sets up the foot with three IK handles and a control hierarchy.

**Parent Constraint:** This makes use of the new parent constraint. This allows for easy control between IK and FK. It uses only one IK chain so that the Move IK to FK command works smoothly.

**Set Driven Key:** This foot uses a number of Set Driven Keys so that the user may roll the foot with one attribute.

Each of these options adds control attributes to the foot control node.

**Foot Control:** A user specified foot control node may be created. Place it in the desired position relative to the skeleton. If left blank, a selection handle will be used.

**Knee Control:** A user specified knee control node may be created. Place it in the desired position relative to the skeleton. If left blank, a locator will be used.

**Note:** This assumes that the leg is built in the side window with the foot pointing in +Z axis. The script has some comments on how to change the setup in terms of the foot node and the poleVector locator.

## Setup Back

This tool sets up control objects for a character's back, including the advanced twist controls in Maya version 6 that allow twisting controls from both ends of a spline ik.

This information is intended to help you work with or customize the back setup bonus tool. It explains what the script does, what its assumptions are and other ways you can tweak the setup.

To use, you need to have a skeleton already made with a root joint and spine joints. Select the first spine joint next to the root and the last spine joint. Select the options you want and press the Rig Back button. If you are using your own control objects, you must load them into the option box before selecting the joints and pressing the Rig Back button. Once the rig is created you can animate the control objects (default poly cubes or custom objects) or clusters to control your back motion. This tool integrates well with the foot setup tool in bonus tools.

### Assumptions and Limitations:

The script assumes that your character has a vertical spine and faces forwards on the +Z axis. The script will flip the involved joints axes so that Y points in -Z and X points down the bone. These orientations are the most common in rigging. No choice is given here, so beware if your direction of your axes differs. It does not work well with bound surfaces as they will twist if the joint axis is reset by the script. You may be able to compensate for this by rotating the joint axis after the fact, but better to create the setup before binding or have the joint axes point the same way as the script would. The script isn't made to redo an existing setup, so you need to either undo, or delete the control objects, clusters, spline IK handle and curve. You can keep custom control objects, but you will need to delete the constraints from the root if you chose "Use Bottom for Root" in the options.

### **What the tool actually builds:**

It creates a curve and the spline IK handle between the selected joints and then creates a cluster for each CV on the curve. It builds polygon cubes for controls and uses them for the start and end controls of the spline IK, or uses objects you load in the options window. It takes advantage of the advanced twist controls for spline IK, allowing twist controls at either end of the spline IK, and adjusts the settings best for a spine. You can see the control objects assigned to the IK handle in the Attribute Editor under IK Solver> Advanced Twist Controls. There are many choices in how you can use this feature, but the script settings should be useful for a spine. The clusters are parented to the top or bottom spine controls. Moving a control gives a gross change in the shape of the spine. The clusters can be used for finer control. Use Bottom Control Object for Root allows you to use the bottom control object as a point and orient constraint for the root/pelvis.

### **More on using the tool:**

To use your own objects as the top and bottom control for the spine, you need to turn on the flag and then select the appropriate object and hit the Get button. Alternatively, you can type in the name of the object and hit Enter. The script won't move your objects, so place them where you want them to be first. Fewer clusters may mean less detail in spine shape, but it's also less to animate and tends to a smoother looking spine. Once you hit the Rig Back button and Maya creates the rig, the Advanced Twist Controls (Attribute Editor for spline IK handle, under IK Solver Attributes) shows the objects listed as the World Up Objects. These are effectively aim constraints for the spline IK. You can adjust the distribution of twisting down the joints with the Twist Value Type. You can use a ramp to distribute the twisting down the joint chain and animate it if you want to change the distribution without moving shoulders and pelvis. If you aren't creating a biped spine you might want to experiment with the various type of twist controls offered.

You can tweak the script or adjust the advanced twist controls after using the tool to modify the controls. Start from the default settings. For instance, on a quadruped you probably want the joint Y axes pointing in world +Y, and pointing close to -Z (default) will cause flipping if you move the top control in Y. To make the handle compatible for a horizontal spine as in a quadruped, change the Up Vectors for the Advanced Twist Controls to 0,1,0 and 0,1,0. This will stop the flipping and allow you control over a horizontal spine. You might find that the setup can be good for the long neck of an animal if you skip using the bottom control for the root.

You may not want to move the whole back with the cube control objects but rather have a control for the whole torso which would be a parent for the back controls. You could re-parent the clusters to a torso control and animate the clusters separately leaving only the first and last cluster parented to the control objects. Or you could animate them while still parented to the control objects. These choices really get down to how you want to animate. If you do use a torso control, you'll need to use the bottom control as a constraint for the root (Use Bottom Control Object for Root in options, or constrain it yourself). You need to remember too, that the back controls are only a part of a character rig and may need to be constrained or parented to higher level controls to stay with the character as it moves..

## Make Joints Dynamic

**Make Joints Dynamic:** This tool can be used to apply secondary dynamic animation to a joint chain or a series of joint chains. The chains can in turn be attached to an animated character or some other moving object, and will react to the existing animation. This can be useful for creating secondary animation for various character elements such as: ponytails, antennas, ropes, scarves, chains, capes... You may get varying results depending on the type of method you choose, so you may need to experiment with each type as well as its associated settings and attributes.

This tool is also intended as a way to use Maya's various dynamic systems for game characters. The results of any of these effects can be baked down to the joints themselves via the Bake Simulation tool. They can then be exported to a game engine as joint rotations and/or translations.

### Single Chains:

Each of the single chain types uses a curve that will in turn drive an IK Spline handle connected to the joint chain. The primary control attributes will then be added to the handle providing easy access for editing the dynamic animation. In each case, the IK Handle, curve, and all associated dynamic objects will be created and connected automatically.

- **Hair** : HairSystem -> Folicle -> Curve -> IK Spline -> Joints
- **Jiggle** : JiggleDeformer -> Curve -> IK Spline -> Joints
- ~~Softbody~~ : (removed when Unlimited was retired)

Before applying **Make Joints Dynamic** for single chains, you must first select the root of the joint chain that you wish to make dynamic, followed by the end joint. After you choose/ the animation driver type that you'd like to use, you will also have an option for the detail of the curve that will drive the chain (Low = 4 cvs : Med = 5 cvs : High = 6 cvs) Lastly you may set the falloff of the given effect. This refers to the amount that the effect will decay from the end of the chain to the root. The end of the chain will have the most movement, the root will have no movement, and the amount of movement for the joints in between will be determined by the falloff.

Note: In order to modify the falloff afterwards you will need to use the component editor jiggle deformers.

Hair extras: In the case of hair falloff you can simply edit the stiffness ramp widget in the hair system. For hair you can later add collision constraints. Simple sphere stand-ins are recommended whenever possible for better results.

### Multi Chains:

The joint chains that you drive with nCloth must be siblings to one another. It is also generally recommended that they have the same number of joints per chain. Before applying MakeJointsDynamic for multi chains, you must first select the root of each chain. The order is important as it determines how the nCloth object gets built. The verts of the resulting nCloth mesh will match the joint positions exactly.

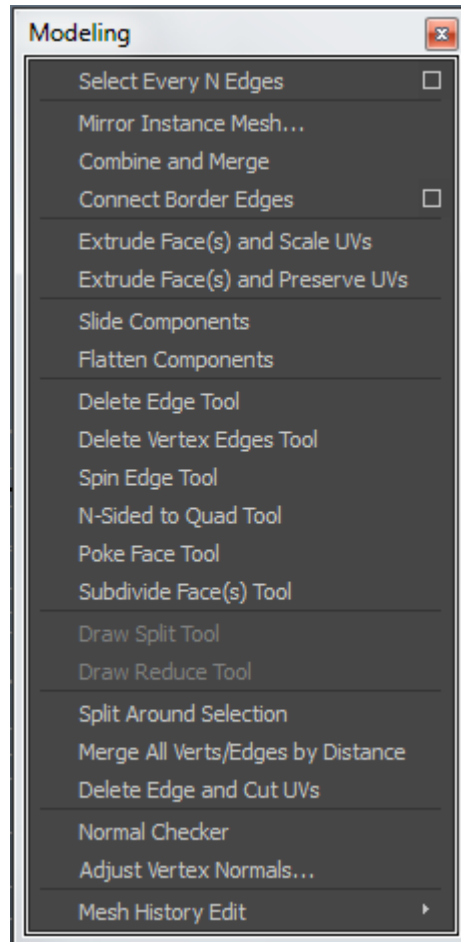
The falloff setting determines how much the static input mesh (e.g. original joint positions) will influence, or limit the motion of the nCloth.

There are 3 methods for linking the nCloth to the joints.

- **Spline IK** - this is the less effective method but may be a bit faster than Standard IK. An IK Spline will be created for each chain. The end result will be joint rotations.
- **Per-Joint IK** - this will create an IK handle for -each- joint/bone in each chain. The end result will be joint rotations.
- **Stretchy Joints** - this will create a locator/constraint for each joint in each chain. The end result will be joint translations; therefore squash and stretch can be achieved. Note: when baking joint rotations will not be affected.

Once you've created the nCloth you may be prompted to select 1 or more objects for the nCloth to collide with. Simply select the object(s) and click the Make Collide button. To bypass this just click No Collisions. You can always add static mesh collision objects later using traditional nCloth methods.

## Modeling



### Select Every N Edges

This tool propagates the current edge ring/loop selection. For example, select an edge, skip the next parallel edge and then shift select the next parallel edge. The result will be that every other edge in the ring is selected.

To use, select edges and open **Select Every N Edges**.

### Mirror Instance Mesh

This tool cuts a mesh in half and makes a mirrored instance for symmetrical modeling. The mesh can be mirrored along any axis in either the positive or negative direction. The result is two meshes, the original cut in half, and a mirrored instance that is linked to the original via constraints for unified transformations. Note that the tool assumes the mesh is at the origin and does all mirroring in world space.

The Combine and Merge tool can be used to rejoin the two mirrored meshes into a single mesh.

To use, select a single mesh and open **Mirror Instance Mesh**.

## Combine and Merge

This tool will take two meshes and combine them into one. If they share a series of coincident edges/verts then it will also stitch (or merge) the coincident edges/verts together.

The tool can be used for any situation where you want to combine and merge meshes together (e.g. an arm to a torso) but it is particularly useful as a companion tool to Mirror Instance Mesh, in order to merge the meshes back into a single, unbroken piece with no seam.

To use, select two meshes and apply **Merge and Combine**.

## Connect Border Edges

This tool creates a new mesh between two selected polygon edge border regions. The borders can be within the same mesh or on two separate meshes. The command will isolate two distinct border regions (internal edges are ignored) and create a new polygon mesh between them.

**Auto Reverse:** Reverses the ordering of one border line based on the distance of the end points

**Reverse:** Forces the reverse

**Map Edge Count:** Uses the edge count of the border parts to determine which edges belong together - instead of just the distance

**Quads:** Convert the resulting triangles to quads

**Quad Angle:** The angle for the "Quadrangulate"

To use, select edges to be connected and open **Connect Borders**. Only border edges will be connected so selection does not have to be precise.

## Extrude Face and Scale UVs

This tool extrudes faces and scales the resultant UVs so that the new UVs are not overlapping.

To use, select face(s) to extrude and apply **Extrude Face and Scale UVs**.

**Note:** There may be unintended scaling issues when applying to faces at the edge of a texture border. This is a known limitation of the tool.

## Extrude Face and Preserve UVs

This tool extrudes faces and but first creates a preserveUV node (via Transfer Attributes) so that the associated texture will not be inadvertently effected by the extrude node. The underlying UVs will be corrected based on changes to the faces that are extruded. This particularly noticeable with offset and scaling of the extrude manip.

To use, select face(s) to extrude and apply **Extrude Face and Preserve UVs**.

## Flatten Components (New)

This tool can be used to flatten a selection of polygon components along a virtual plane. The plane will be created automatically at the center of the components and oriented based on an average normal. A manipulator will be created so that you can then interactively adjust the position and orientation. This tool can be used on faces, edges or verts and can be applied more than once to the same object.

Note: in order to remove/delete the control plane and bake in the flatten effect you will first need to delete history on the mesh.

To use, select 2 or more poly components from a single object and apply **Flatten Components**.

## Slide Components (New)

This tool can be used to slide a selection of polygon components along the existing surface area of a mesh. A heads-up display will be created allowing you to enable/disable the effect. This is not a global effect and must be applied on a per mesh basis. The effect works best when used in conjunction with soft selection in surface fall-off mode.

Note: in order to bake in the effect you will first need to delete history on the mesh.

To use, select 1 or more poly components from a single object (turn on soft select and set falloff to desired value) and apply **Slide Components**.

## Delete Edge Tool (New)

This is the tool version of the delete edge command. When the tool is activated you can click on any edge and it will automatically be deleted. The tool will remain active so you can continue to delete additional edges.

To use, start the **Delete Edge Tool**. When the tool is active, simply click on an edge and it will be deleted.

## Delete Vertex Edges Tool (New)

This tool allows you to easily delete all edges associated with a given vertex. When the tool is activated you can click on any vertex and the tool will automatically select and then delete the associated edges. The tool will remain active so you can continue to delete additional edges.

To use, start the **Delete Vertex Edges Tool**. When the tool is active, simply click on a vertex and its neighboring edges will be deleted.

## Spin Edges Tool (New)

This is the tool version of the spin edges command. When the tool is active simply click on an edge and it will “spin” so that it now connects to the next vertex in each direction. The tool will remain active so you can continue to spin additional edges (or simply hit the g key to continue the spinning the same edge).



To use, start the **Spin Edges Tool**. When the tool is active you will be prompted to select faces and edges for wedging.

### N-Sided to Quad Tool (New)

This tool allows you to easily convert any n-sided face to a quads. When the tool is activated you can click on any face and the tool will automatically apply a Triangulate and then a Quadrangulate in succession. The tool will remain active so you can continue to converting additional faces.

To use, start the **N-Sided to Quad Tool**. When the tool is active, simply click on another face to continue converting.

### Poke Face Tool

This is the tool version of the poly poke command.

To use, start the **Poly Poke Tool**. When the tool is active, simply click on a face to apply a poke. The tool will remain active so you can continue poking additional faces.

### Subdivide Face(s) Tool

This is the tool version of the poly subdivide command.

To use, start the **Poly Subdivide Tool**. When the tool is active, simply click one or more face to select them. Hit enter and subdivide will be applied.

### Draw Split Tool

This tool splits or subdivides a polygonal mesh by simply interactively drawing over a sequence of edges to split or subdivide. The edges where the drawn stroke crosses the mesh will be split or subdivided at the crossing points.

Drawing with the LMB –vs- MMB varies the behaviour of the tool. SHIFT and CTRL can also be used to change the behaviour of the tool.

- LMB = Splits crossed edges
- LMB + CTRL = Splits crossed edges and snaps to verts at start and end of path.
- MMB = Subdivides crossed edges

**Note:** This requires the drawSplitTool.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

Extended documentation for this tool can be found in the Bonus Tools install location ->

**.\\MayaBonusTools2013\\docs\\drawSplit.pdf**

## Draw Reduce Tool

This tool reduces a polygonal mesh by simply interactively drawing over its edges. This tool combines 4 existing methods of reducing mesh topology in Maya, wrapped into a single, more intuitive interface. Collapsing/merging operations are controlled by the "drawn stroke" itself. The edges that the drawn stroke crosses over the mesh may have one of the following reduction operations done to them: "Collapse Edge", "Merge Vertices", "Delete Edge" or "Delete Vertex".

Drawing with the LMB –vs- MMB varies the behaviour of the tool. SHIFT and CTRL can also be used to change the behaviour of the tool.

- LMB = Collapse or delete crossed edges (depending on reduction type)
- LMB + CTRL = Collapse/delete and snap crossed edges.
- MMB + CTRL = Delete nearest vert for crossed edges

**Note:** This requires the drawReduceTool.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

Extended documentation for this tool can be found in the Bonus Tools install location ->

`.\MayaBonusTools2013\docs\drawReduce.pdf`

## Split Around Selection

This tool finds the edge ring around the selected components and then splits it.

To use, select some polygon components and apply **Split Around Selection**.

## Merge All Verts/Edges by Distance (Updated)

This tool merges all of the verts on a mesh that are closer than the selected 2 verts or 1 edge. The distance between the selected verts is used as the merge tolerance in determining what other verts on the mesh should be merged.

In this release the tool has been updated to work with an edge as well.

To use, select two verts or a single edge and apply Merge Vertices by Distance.

## Delete Edge and Cut UVs

This tool deletes an edge but first cuts the bordering UVs. This is useful when deleting a border edge.

To use, select an edge apply **Delete Edge and Cut UVs**.

## Normal Checker

This tool highlights reversed normals on selected objects. Faces with reversed normals can then be easily selected and reversed. Selected objects are made single sided. A duplicate is made and inversed. The

duplicate is put on the normalCheckerLayer and coloured red.

To use, select one or more meshes and apply **Normal Checker**. To remove the temporary normal checker objects, clear the selection (i.e. select nothing) and apply **Normal Checker** again.

## Adjust Vertex Normals

This tool creates a window for interactive vertex normal adjustment.

To use, open **Adjust Vertex Normals**. Select a vertex or a face vertex. The sliders will update to show the current normal values. If more than one item is selected, only the values of the first will be displayed. Changing the values will change the values for all selected.

## Mesh History Edit -> Delete Upstream Mesh History

This tool deletes upstream history of the selected node in the channel box. Anything before the selected node will get “baked” and the selected node as well as anything downstream will be preserved. This allows for more control of deleting history.

To use, select a mesh and an input node in the Channel Box and apply **Delete Upstream Mesh History**.

## Mesh History Edit -> Insert Intermediate Mesh Shape

This tool inserts a poly shape node upstream of the selected node in the channel box. This allows for modifications to the middle of history chains.

To use, select a mesh and an input node in the Channel Box and apply **Insert Intermediate Mesh Shape**

## Mesh History Edit -> Copy/Paste Mesh History

Copy/Paste Mesh History is actually two separate commands that will copy and paste polygon history between meshes. These were originally intended for editing **blendshapes**, but can be used with regular poly objects. In the past, if the base mesh or a target mesh for a blendshape, required a topology change, this tool could be used to apply those changes to every mesh in the blendshape. This can now be done directly in Maya with BlendShapes->BakeTopologyToTargets.

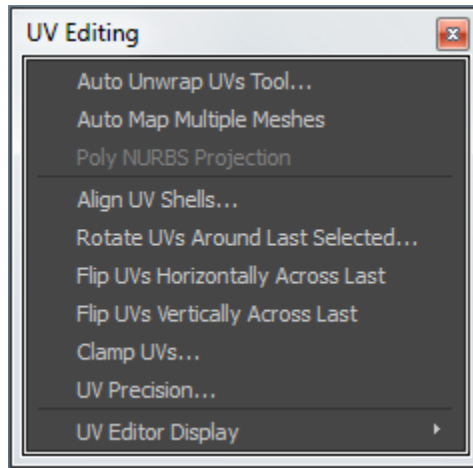
This tool can still be used for copying basic poly edits from one mesh to another. To use, first select the mesh with the history you would like to copy. Graph this mesh in the hyperGraph. Select the history nodes in order (first to last) and apply **Copy Mesh History Nodes** to Copy. Second, select the meshes to copy the history to and apply **Paste Mesh History Nodes**.

### Notes:

- For the history to be properly copied, vertex tweaks need to be recorded as nodes. To do this, use Edit Polygons->Move Component.
- These commands assume that mesh topologies are basically the same. This means that they have the same number of vertices with the same vertex order. You will have varying degrees of success if the topologies differ.



## UV Editing



### Auto Unwrap UVs Tool

This tool can be used to quickly and easily create UVs shells for a variety of objects ranging from roads to pipes to horns to trees to faces. Shells can be automatically unwrapped in various ways based on different options.

#### UV Shell Creation

- **Uniform Face Method** : Tries to make each face in the UV shell the same general size in UV space (e.g. a uniform road or pipe)
- **Proportional Face Method** : Tries to scale each face in the UV shell according to their 3D size (e.g. an uneven path or tube)
- **Basic Unfold** : Uses a simple unfold algorithm to spread out the resulting UV shell (e.g. a horn, tree branch, arm or leg)
- **Advanced Unfold** : Takes symmetry into account by initially aligning along a specific axis (e.g. a face or head.) This option also adds the additional step of defining points of symmetry (e.g. tip of the nose or center of the chest)

#### Initial Projection

- **Facing X** (used only by advanced unfold mode)
- **Facing Y** (used only by advanced unfold mode)
- **Facing Z** (used only by advanced unfold mode)

#### UV Shell Layout

- **Uniform Fit** : Layout new UV shells uniformly (no distortion) in UV space between 0-1
- **Stretch Fit** : Layout new UV shells non-proportionally (stretch to fit) in UV space between 0-1
- **Proportional Fit** : Layout new UV shells along with any other existing shells for that object based on actual 3D world space size
- **None** : Do not alter size or layout shells at all in UV space

## Display Settings

- **Use Test Pattern Shader** : Creates test shaders for better viewing of border edges as well as resulting UVs
- **Set Edge Color to Red** : Temporarily sets selected edge color to red for better visual feedback while tool is active
- **Isolate Select Object/Faces** : Isolates only selected object or faces while tool is active and hides all others

## Auto Map Multiple Meshes (Updated)

This tool creates an Automatic Mapping node to control the mapping on multiple meshes.

Previous to this release this tool did not work as advertised and gave very unpredictable results. It has been completely rewritten in this release to achieve the same goal but using a different method. It can be used to create a single UV set with no overlapping UVs for multiple meshes. The most common and practical use for this would be creating secondary UVs for light maps that span across several objects. The resulting UVs will be controlled with a single auto UV projection node that will be applied to a temporary object called **autoProjectautoMapMesh** and then transferred to the original meshes via transfer attributes.

Important note: In order to “bake” in the UVs you will need to delete history on the target objects.

To use, select meshes and apply Auto Map Multiple Meshes.

## Poly NURBS Projection

This item is a NURBS to mesh UV projection. It transfers the UVs and shader from a NURBS surface to a poly mesh based on closest point. It then allows the user to manipulate the NURBS surface by translation, rotation, scale and moving CVs and the UVs of the mesh will be updated in real time. The intended workflow is for a user to model a mesh and then a NURBS surface that will wrap around the mesh like a sock. After the NURBS surface is textured, the command is applied which will assign the UVs of the mesh to be the UV of the point on the NURBS surface that is closest.

Node: Performance on this tool is somewhat poor and may not be acceptable for higher resolution meshes.

To use, select the NURBS surface followed by the mesh, and apply **Poly NURBS Projection**. The shader and UVs should be transferred to the mesh. Now you can translate/rotate/scale the transform and CVs of the NURBS surface and the UVs of the mesh should be updated in real time.

## How It Works

If you selected faces on the mesh the first thing the plug-in will do is split the UVs along the border of the selected faces to maintain the texture border. The polyNurbsProjectionNode is a construction history node that takes the world space mesh and NURBS surface as input and computes the resulting mesh with projected UVs. The algorithm is quite simple and works by iterating through each vertex of the selected faces. For each vertex, an API call is made to `MFnNurbsSurface::closestPoint` to get the point on the NURBS surface that is closest to the vertex. The UVs of this point are assigned to the vertex.

## Limitations

The complexity of this plug-in is  $O(mn)$  where  $m$  is the number of vertices on the mesh and  $n$  is the number of CVs in the NURBS surface. Since the plug-in updates in real time a complex mesh and NURBS surface will result in SLOW interaction when you start changing the NURBS surface. That's why the interactiveness of the plug-in is limited to meshes with low poly counts.

**WARNING:** the 'polyNurbsProjection' command will delete construction history on the mesh right before it hooks up the polyNurbsProjectionNode. I had to force this to prevent the user from hooking up 2 polyNurbsProjectionNodes which caused some really buggy behaviour.

Spherical NURBS projections caused some weirdness in the projection in areas around the seam of the NURBS surface. NURBS planar projections work really well.

**Note:** This requires the polyNurbsProjection.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

## Align UV Shells

This tool aligns a UV Shell to the left, right, top and bottom boundary of another UV shell.

To use, open the Align UV Shells window... Select one or more UVs on different shells in the Texture Editor and select the alignment option from the window.

**Note:** This is a python based tool and may not work after default installation. See installation instructions on setting up your python path if you want to use this tool.

## Rotate UVs Around Last Selected

This item will rotate UV coordinates in the UV Texture Editor using the last selected UV as a pivot.

To use, open **Rotate UVs Around Last Selected** window. In the UV Texture Editor, select the UVs to rotate and select a UV to act as the pivot point as the last selection. Enter the rotation value in the window and press Rotate UVs.

## Flip UVs Horizontally Across Last

This item will flip UV coordinates horizontally in the UV Texture Editor using the last selected UV as a pivot.

To use, select UVs make desired UV pivot the last selection, then apply **Flip UVs Horizontally Across Last**

## Flip UVs Vertically Across Last

This item will rotate UV coordinates vertically in the UV Texture Editor using the last selected UV as a pivot.

To use, select UVs make desired UV pivot the last selection, then apply **Flip UVs Vertically Across Last**

## Clamp UVs

This item will clamp the selected UVs to a user specified bounding box.

To use, select the UVs to clamp and open **Clamp UVs...** Enter the bounding box coordinates (U min., V min., U max., V max.) and press OK.

## UV Precision

This item will adjust the precision of selected UVs.

To use, select the UVs to change and open **UV Precision...** Enter the number of decimal places that should be kept for the UV coordinates and press OK.

## UV Editor Display -> UV Texture Editor Image Dimming

See full description in Display section.

## UV Editor Display -> UV Texture Editor Wireframe Color

See full description in Display section.



## Dynamics

### **Paint Emitters Tool**

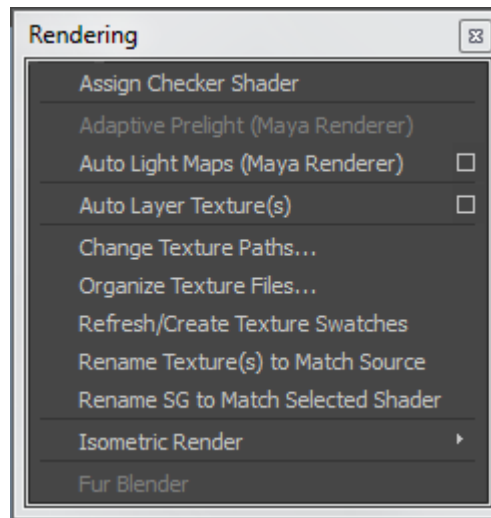
This tool allows you to paint emitters through the familiar artisan interface.

To use, select an object to paint emitters onto and open the Paint Emitters Tool. A window will pop up that allows you to control the emitter attributes.

### **Make Joints Dynamic**

See Animation section for description

## Rendering



### Assign Checker Shader

This tool assigns a new checker shader to selected meshes.

To use, select a mesh and apply **Assign Checker Shader**.

### Adaptive Prelight (Maya Renderer)

This tool will subdivide the selected mesh(es) based on the pre-lighting that gets applied through the command. You must have lights that are affecting the mesh in order for the tool to work.

**Iterations:** The number of times to subdivide the mesh.

**Tolerance:** If the color variation between two adjacent vertices is within the tolerance, there will be a division.

**Faces:** The method for subdividing the mesh.

**Shadows:** Calculate shadows for pre-lighting.

To use, setup lighting, select mesh to light and subdivide, then apply **Poly Adaptive Pre-light**.

**Note:** This requires the polyVariance.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

### Auto Light Maps (Maya Renderer)

This item will generate light maps based on the options specified in the option box:

- **Anti-alias:** Anti-alias the resulting light maps.
- **Bake Shadows:** Include shadows in the light maps.
- **All Meshes:** Use all meshes in the scene or just the selected meshes. For scenes with a lot of variety in the geometry size, it can be more efficient to generate light maps in a number of passes with different resolutions.

- **New UV Set:** Create a new UV set for the light map.
- **X Resolution:** X resolution of the light map.
- **Y Resolution:** Y resolution of the light map.
- **File Format:** File format of the light map.
- **Blend Mode:** Blend Mode for the layered texture. 4 is Add, 6 is multiply.
- **File Suffix:** Text to apply to the end of the light map file name.
- **Shading Group Name:** Generate light maps requires the name of the shading group to use for the light maps. A default lambert shader will work well for this. If no shading group is specified or the specified shading group does not exist, the command will fail.
- **UV Set Name:** Name of the UV set to use or create. If no name is specified, the current UV set will be used.

To use, selected objects to bake lights for, set the options in the **Generate Light Maps** window and apply.

## Auto Layer Textures (New)

Note: This tool combines the functionality of the old auto layer tools and therefore replaces both. It will work slightly differently depending on what is selected.

If a single texture is selected it will insert a layered texture node between the selected texture and its shader if it is indeed connected to a shader.

If two or more textures are selected it will create a layered texture node and then using that node it will layer the selected textures in the order that they were selected. Changing the order of the selection will change the order that they are layered. If the first texture selected is also connected to an existing shader then the layered texture node will be inserted between the first texture and the shader.

There is now an option for including the alpha of the selected textures when layering. If this option is off then only the diffuse will be layered. If this option is on, then the alpha of each texture will be used as a mask between the textures/layers.

## Change Texture Paths (Updated)

This tool lets you change texture paths for either selected or all textures in a scene. It will work with all textures in the scene or specific textures selected in the HyperShade. The paths can either be set a relative or absolute.

In the previous release there was a bug that prevented this tool from setting relative paths correctly. That bug has been fixed. In addition the UI has been updated to hopefully be a bit more intuitive.

## Organize Files

This tool lets you move or copy textures (image files) that are associated with the current scene from their current location to a new location. You also have the option to update the paths on the texture nodes to match the new location.

### How it works:

If your scene is using a face.jpg that is sitting inside C:/myImages, then you can either move or copy that image to C:/mySelectedDirectory. To select where you want to move/copy, you can pick a directory in 3 ways:

1. Browse the directory. Also the directory that shows up automatically (next to the browse button) is the source images directory of your current project.
2. Select a source images directory from one of your existing projects.
3. Select a bookmarked directory from the "Centralized images library"

You also have the option to switch the path on the texture node. For example...

C:/myImages/face.jpg ----> C:/mySelectedDirectory/face.jpg

When you choose to move the files, the UI will automatically select the "change path" option for you. This is necessary since otherwise your scene will end up looking for file textures that no longer exist after they have been moved.

The Organize Files UI is broken down as follows...

- A browser to select the directory where you want to send all your file textures. Also you can add a new directory where ever you want.
- A scrollable list that allows you to pick a source images directory from the existing projects. To select a directory you either single click and press the select button or double click on the directory.
- A way to store or bookmark certain paths you might use frequently. The idea behind this is that large production houses have centralized texture libraries that everyone uses. The paths inside those libraries are stored inside a txt file on your home directory. In a production environment this txt file will be owned by a system administrator and a link pointing to it will be inside everyone's home account. Currently I have also given the option to add to the list or delete a path from the list. A system admin may have to do some extra work to make this work inside a large network for productions. First of all there is the issue of cross platform addresses. An address that makes sense on a windows machine might become invalid on a Linux machine. The ability to edit the list can be given to a select few people to avoid confusion but for this version each user has his own list which he can edit.
- The paths inside the txt files can become invalid if you delete the directories. Checks have been added at various levels that catch this and give you a message if the directory no longer exists. To select a directory you either single click and press the select button or double click on the directory.
- Option to either move or copy the files. Option to switch the file texture paths to the new copy of the image that sits inside the directory that you specified.
- You can either move/copy all the textures or move/copy those connect to the selected nodes.
- The script finds out if the selected node has direct or indirect connections to a file node. For example if you have selected a joint that affects a surface and the surface has a material assigned to it that is using a file texture then the script navigates to that file texture.
- A report that gets printed in the script editor.

## Rename Texture to Match Source

This tool will rename one or more selected texture nodes to match the name of the actual source file. For example, a texture file node that is pointing to a file called face.tga will get renamed to "face".

## Rename Shading Group to Match Shader

This tool will rename all Shading Group nodes to match the names of the selected shaders. For example if a shader is named "Concrete", the associated ShadingGroup will be renamed to "ConcreteSG".

## Isometric Render

This menu allows for isometric rendering of Maya scenes. All geometry in the scene is grouped under a new node and the shear attributes are set for an isometric render from the front view. For other windows, adjust the shear attributes on the IsometricWorldNode.

- **Isometric Render:** Renders the current viewport.
- **Preview:** Displays the scene in isometric mode.
- **Reset:** Resets the scene so it is not in isometric mode.

The resolution gate for orthographic does not work well. To get an idea of the resolution gate for an orthographic view, Panels->Tear Off or Tear Off Copy. Then apply some MEL:

```
lsUI -windows; //lists all the current windows
```

The freshly torn off window will likely be at the end of the list with a name like "modelPanel6Window". Edit the window's width and height. The width and height may be calculated as follows:

```
width = x resolution + 12  
height = y resolution + 52
```

To determine the windows current width and height:

```
window -query -width modelPanel6Window;  
window -query -height modelPanel6Window;
```

To set the width and height (for a 320x240 render):

```
window -edit -width 332 modelPanel6Window;  
window -edit -height 292 modelPanel6Window;
```

## Fur Blender

Blend two selected fur descriptions onto the third selected fur target. Style and Color can be blended separately.

**Note:** The Fur module/plugin must be loaded in order to use **Fur Blender**.

To use, select either 3 surfaces with fur, 3 fur descriptions or 3 fur feedbacks - select the two sources first, followed by the destination.

## Misc

### 3DS Import

This is a plug-in that will add a 3ds option to the regular Maya file import UI. This plug-in has not been updated in a while so it may be unpredictable.

**Note:** This requires the 3dsImport.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.

### Cut Tiles For Image

This is a MEL script that will cut a specified image into smaller pieces. This script is included for command line usage.

Here's a sample for using the command:

```
cutTilesForImage 3 3 64 64 file1 test1 jpg ruby;
```

arguments: *int \$numX, int \$numY, int \$resX, int \$resY, string \$inFile, string \$outFile, string \$fileFormat, string \$name*

### Misc Procedural Textures

There are a number of procedural texture plug-ins included with Bonus Tools including:

- denimTexture.mll
- corrossionTexture.mll
- frecklesTexture.mll
- ringTexture.mll
- scallopTexture.mll
- splatterTexture.mll
- streaksTexture.mll
- treeBarkTexture.mll
- veiningTexture.mll
- woodGrainTexture.mll

Once these are loaded in the Plug-in Manager they will be available in the HyperShader Create texture section.

### Create CPV Render Node

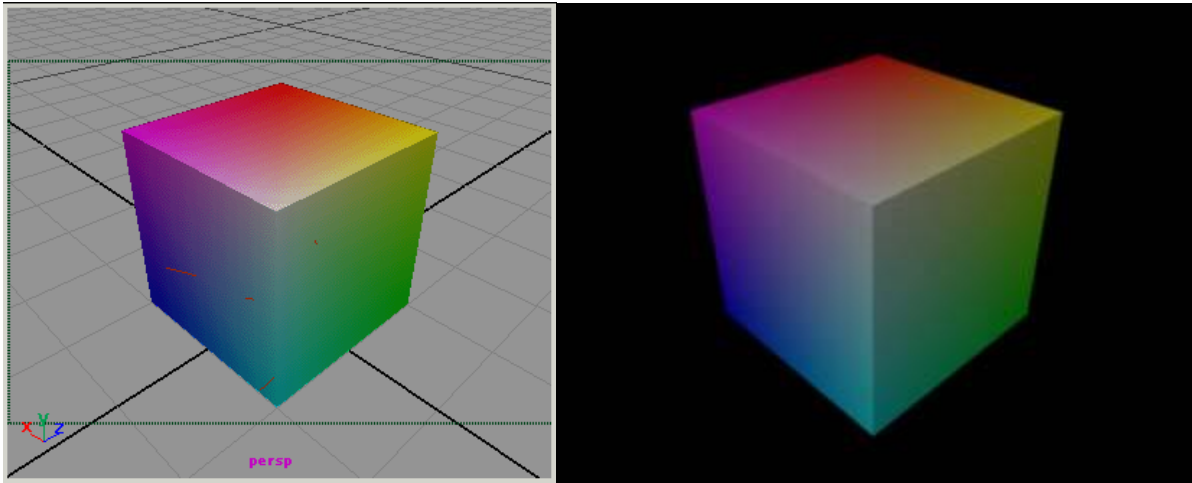
**Note:** This plug-in is somewhat obsolete as cpv can now be rendered directly with Mental Ray.

CPV Render Node is a color utility plug-in that allows you to software-render color per vertex assigned to polygonal geometry using the Maya renderer.

- The CPV node can be assigned to any color type attribute of a node. So, it can be connected to shader nodes, texture nodes, utility nodes and what have you.
- It can also compute CPV transparency.

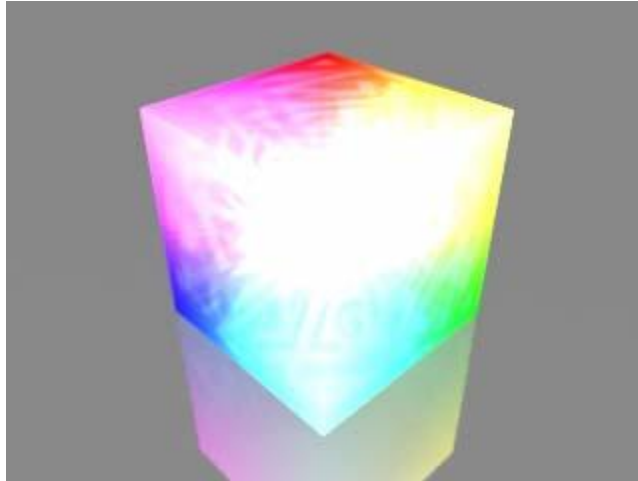
### Example 1: Simple SW Color Per Vertex Rendering

1. Create a polygon cube (pCube1).
2. Assign a new shader to the geometry (blinn1).
3. Paint/Apply color per vertex.
4. In Hypershade, create a cvColorShader node (swCPV for short) and connect it to Color attribute of the shader.
5. Render it. This renders cpv as the color component of the shader.



### Example 2: with File Texture and Raytracing

1. From Example 1, disconnect swCPV node from the shader (blinn1).
2. Assign a file texture to Color attribute of blinn1.
3. Reconnect swCPV node to Incandescence of blinn1.
4. Render it.
5. Create a polyPlane under the cube and assign a blinn shader.
6. To use alpha component of CPV, this also needs to be connected to the shader. To do this, Shift-drag & drop the swCPV node over to the shader. Then, connect outAlpha (which is actually transparency) to each Transparency (R,G,B) attribute of the shader.
7. Open Render Global, and check Raytracing on and render.



**Cautions:**

1. Depending on the type of connections, the actual result may not be viewed in the viewport.
2. A shader with a swCPV node connected should not be assigned to multiple objects. The shader should be copied and two swColorPerVertex nodes must be created and assigned respectively.

**Note:** This requires the cvColorShader.mll plug-in to be loaded - see BonusTools section of the Plug-in Manager.



## Removed

The Following tools have been removed from the Bonus Tools UI in this release but the associated scripts and/or plug-ins have been put in the **MayaBonusTools2013/scripts/obsolete** and the **MayaBonusTools2013/plugin/obsolete** folders.

- Merge Connected Border Edges
- Select Poly Projection Node Faces

## Contributors

Most, if not all of these tools were developed on personal time by a number of people.

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