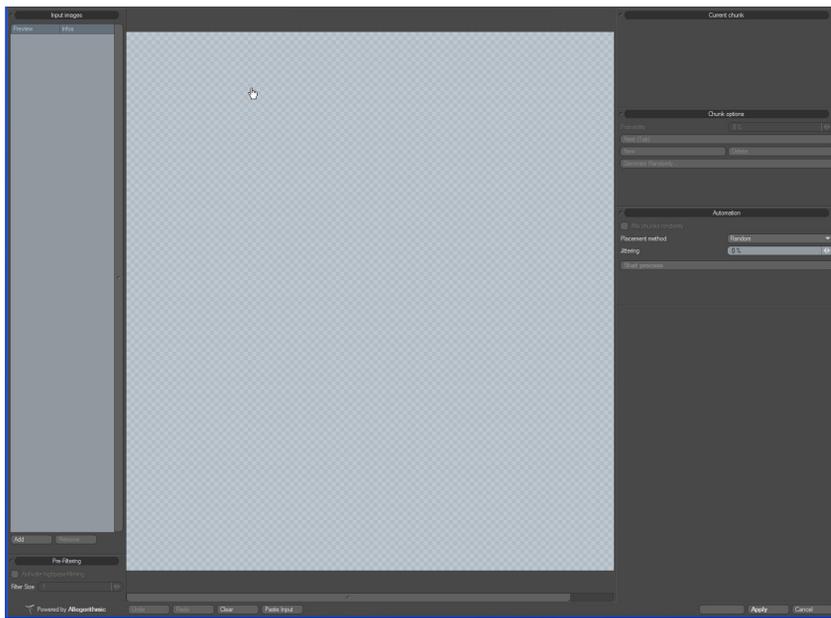# Luxology Image Synth

Understanding Image Synth

I mage synth is designed to allow you to find new ways to use existing images. There are two main results of using image synth. First it can use lower resolution images to create larger ones and secondly it creates maps that are perfectly tiling. There are many ways to feed the Image Synth engine. You can use a complete single image to grow a new one, you can use multiple images to blend into something new and/or you can use fragments or "chunks" of single or

multiple images.

While Image Synth may seem like magic, it really isn't. In fact, while Image Synth can work miracles it is highly dependant on the seed images that you choose. Once you understand a few basic guidelines for choosing and preparing seed images you will be amazed with what you can accomplish nearly automatically.

Navigating the Interface

Input Images

This is the image bin where you add and manage seed images and their "chunks". There are two buttons located at the bottom of the Input Images bin, Add and Remove.

Add: Pressing the Add button allows you to open new seed images into imageSynth. Use the file requestor to navigate to the desired file, select the file and press enter or click OK. imageSynth can load most standard image formats. If you have an image that will not load into imageSynth you can most likely convert it in Photoshop. PNG happens to be a favorite around here as it is loss less and compresses nicely.

Remove: Pressing the Remove button will delete the currently selected seed image from the imageSynth session. You can select multiple images by holding the Shift key down and clicking on the images in the Input images bin.

Once you have Added a seed image to the session you will see that the two columns in the Input images bin provide a preview of the image and informative text. You may also note that there is a small + icon just to the left of the preview image. Clicking the + will expand the list of "chunks" derived from the seed image. By default each see image has a single "chunk" associated with it that encompasses the entire seed image.

You may also notice there is a Chunk ID number and probability rating. These are used when there are more than one chunk associated with the image.

Pre-Filtering

This provides a convenient method for quickly adding a high-pass filter to images while inside image Synth. Using a high-pass filter will help remove some subtle shading gradients that can cause undesirable artifacts in the final image. The high-pass filter evaluates color gradients and based on the filter size averages pixels together to create a general "flattening" effect to the image. The lower the filter size the more flat the image will become as the filter size merely relates to the size of the radius in pixels in which sharp color changes can occur.

(Tip! Photoshop has a High-Pass filter in the Filter>Other menu. The integrated High-pass filter in Photoshop has a wider range. If you find that you need more control over your seed image it is recommended that you work with it in Photoshop prior to bringing it into image Synth. After all, Photoshop has quite a set of tools for image editing.)

Main Image

The large area in the middle of the interface is where all the action happens.

At the bottom of the screen you will find three buttons; Undo, Redo and Clear. The Undo/Redo features affect the interactive placement of chunks in the main workspace. Undo/Redo does not affect the setting of various numeric entry or choices from pop–ups in the interface.

Clear will reset the workspace.

Current Chunk

The Current Chunk window provides an interface for displaying and editing existing chunks as well as creating new ones. There are three buttons at the bottom left of the window. These buttons are Rectangular Selection, Lasso Selection and Toggle inner/outer limits.

Rectangular selection: In this mode using the left mouse button to click and drag in the Current chunk window will draw a rectangle. Everything inside the selection rectangle is included as part of the current chunk. You can add to a current selection by holding the shift key down while you drag in the Current Chunk viewport. The Alt key allows you to subtract from the current selection. Simply using the left mouse will create a completely new selection replacing the previously drawn selection area.

Lasso Selection: In this mode using the left mouse button to click and drag in the Current chunk window allows you to freehand draw a selection area. Everything inside the selection lasso is included as part of the current chunk. You can add to a current selection by holding the shift key down while you drag in the Current Chunk viewport. The Alt key allows you to subtract from the current selection. Simply using the left mouse will create a completely new selection replacing the previously drawn selection area.

Outer/Inner Limit Selection mode toggle: By default the Outer limit mode is active. Any pixels within the "outer limit" selection are not guaranteed to be included in the final image. The outer limit is more of a "suggestion" to the engine of which pixels to use. The outer limit selection is identified by a green outline. The inner limit selection is identified by a red selection. Anything within the inner limit selection is guaranteed to be added to the image at the time the chunk is stamped down. This mode toggle affects both the lasso and rectangle selection options.

Chunk Options

Each image can have any number of chunks. Chunks can be manually created by using the selection tools or automatically generated at random. The Chunk Options window is where you can create and manage new chunks.

Probability: (This feature only activates when the "Mix chunks randomly" option is enabled. When there are more than one chunk defined for the session the filter allows you to determine how likely it is that a particular chunk will be used during the synthesis process. By default, adding new chunks causes all probability values to decrease accordingly since the sum of all probability values must equal 100%. Similarly, if you manually change one probability value the others must change in value to compensate.

Next: This button allows you to quickly cycle through all chunks. You can use the Tab hot key to quickly cycle amongst the chunks.

New: Pressing the new button will create a new chunk. By default new chunks created this way begin with the entire seed image selected. Once the new chunk is created you can use the selection tools to specify the area of the seed image you want to use for this chunk.
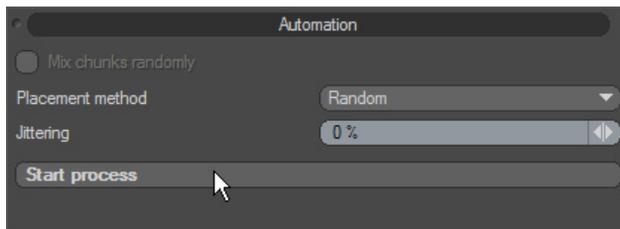
Delete: Pressing this button will delete the current chunk from the session.

Generate Randomly: Use this option to quickly define a set of chunks. There are two options; Number and Size.

Number of chunks: Defines the number of chunks to be generated.

Size of chunks: Percentage of seed image that each chunk should cover.

Automation

Mix chunks randomly: Activating this setting enables the filter to mix multiple chunks during the synthesis process. This control is disabled until there is more than one chunk available either via adding new more than one seed image or by having multiple chunks selected on the seed images).

Placement method: This is a pop-up choice that allows you to pick between a random or semi-regular distribution method.

Random: This placement method will place the image chunks into the main image in a random pattern. When this option is selected the value field below it will show as the Jittering percentage. By default this value is 0% which will result in an initial distribution of chunks that is somewhat regular. Once the initial patter has been populated more chunks are added to fill the gaps in a random fashion.

Jittering: This percentage value controls the amount of random jitter applied to each chunk placement during the synthesis.   The larger the value the more each chunk placement will vary from the usual initial distribution.

Semi–regular: This option places the chunks starting at the top left and working its way to the right until it reaches the end of the row at which point the placement returns to the left side of the main image and begins again.

Covering Factor: When using the Semi–regular placement option the Covering Factor becomes available. This setting determines how much each chunk will overlap its neighbors) when being placed into the main image. The default value of 25% provides a good "pad" providing the synthesis process plenty of pixels in each of the involved chunks to have a good opportunity to create a good solution.

Start process/Stop: This is a toggle button that will begin and stop the synthesis process.

Manually placing chunks

Once you have a seed image and chunk selected you can simply paste the chunk anywhere in the main image area. If you click the chunk down over some existing pixels the synthesis engine will determine a best fit of the existing pixels and the pixels that exist in the chunk. If you have not defined any "Inner limits" pixels it is possible that the engine will not find an acceptable fit and will simply not change the image. If you wish to force a chunk or a portion of it, into the image you should make certain to use the Inner Limits selection mode to delineate the area you wish to persist in the chunk.

Rotating and Scaling chunks

When you manually place chunks you can rotate and scale them interactively. Using the Mouse wheel will scale the chunk up and down. Holding the shift key while you roll the wheel will adjust the scale steps to a more fine level. To rotate a chunk simply hold down the Ctrl key on Windows or the Alt key on the Mac.

With the right content this tool can truly seem like magic. With a little bit of understanding about the settings and rules of synthesis you will find the filter is far more rewarding than when you simply load an image and let it cook. While it is quite simple to get reasonable results in many cases, there is almost an art to using the tool to its full capacity. As such we believe the best way to learn the tool is to see it in action and/or to experiment. To that end we have included several tutorial videos that you can watch to quickly learn how to use the filter and how to even master it. Additionally we have collected a number of images for you to practice with.

We hope you enjoy the synthesis process as much as we do.