

Bryce 5 - Tree Lab & Landscape Generation

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If you've used Bryce in the past for any kind of landscape generation, you have probably wrestled with the problem of how to produce a large variety of realistic looking trees. The tree models included with the software weren't adjustable by the user and they lost credibility in a close-up view. Corel has gone a long way to remedy these problems with the new Tree Lab included in Bryce 5.

The picture at the top of this article "Palm Trees with Pyramids" was produced with Bryce 5 using the Tree Lab and the Terrain Editor. The grass around the oasis was generated with Plant Studio2 and imported into Bryce. The picture was rendered using the new Soft Shadows option in the Sky Lab.

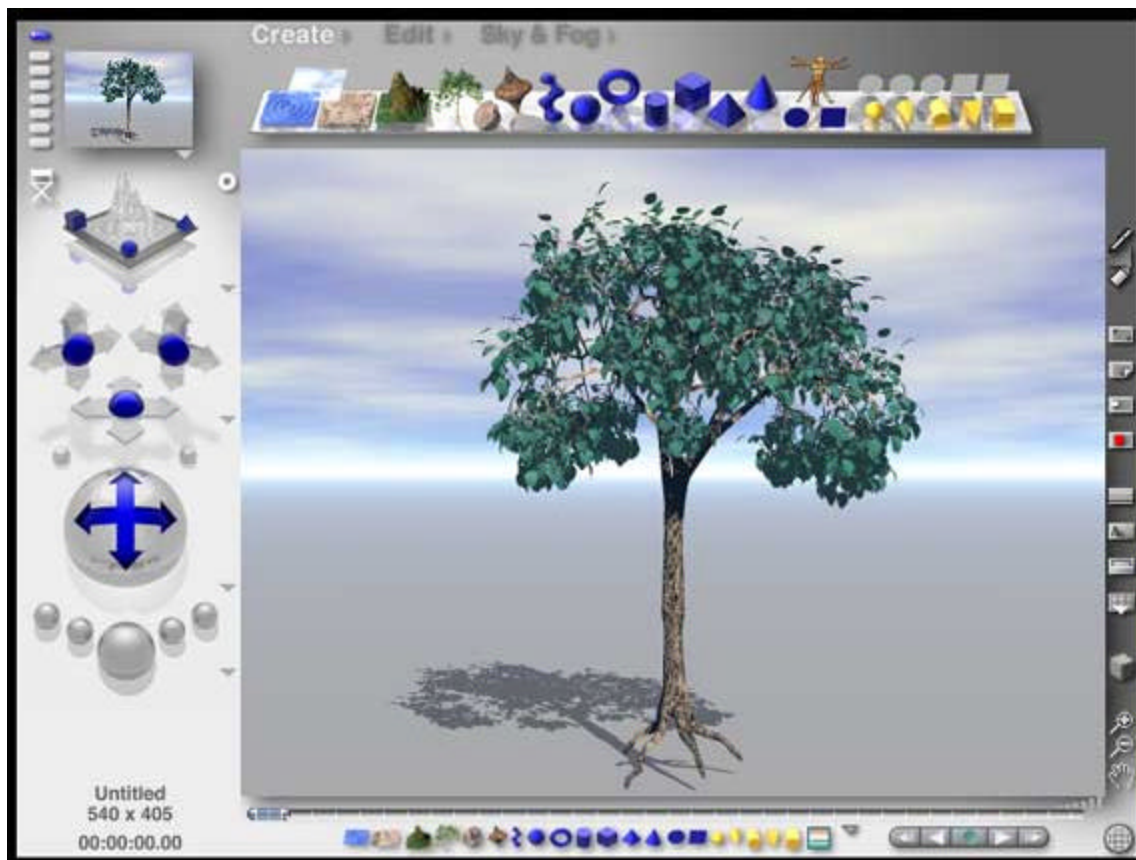
This tutorial is arranged into four parts: (1) Using the Tree Lab, (2) Assembling the picture, (3) a wish list of features that I believe would enhance the

performance of Bryce, and (4) Table 1 and Table 2 which are referred to through out the text.

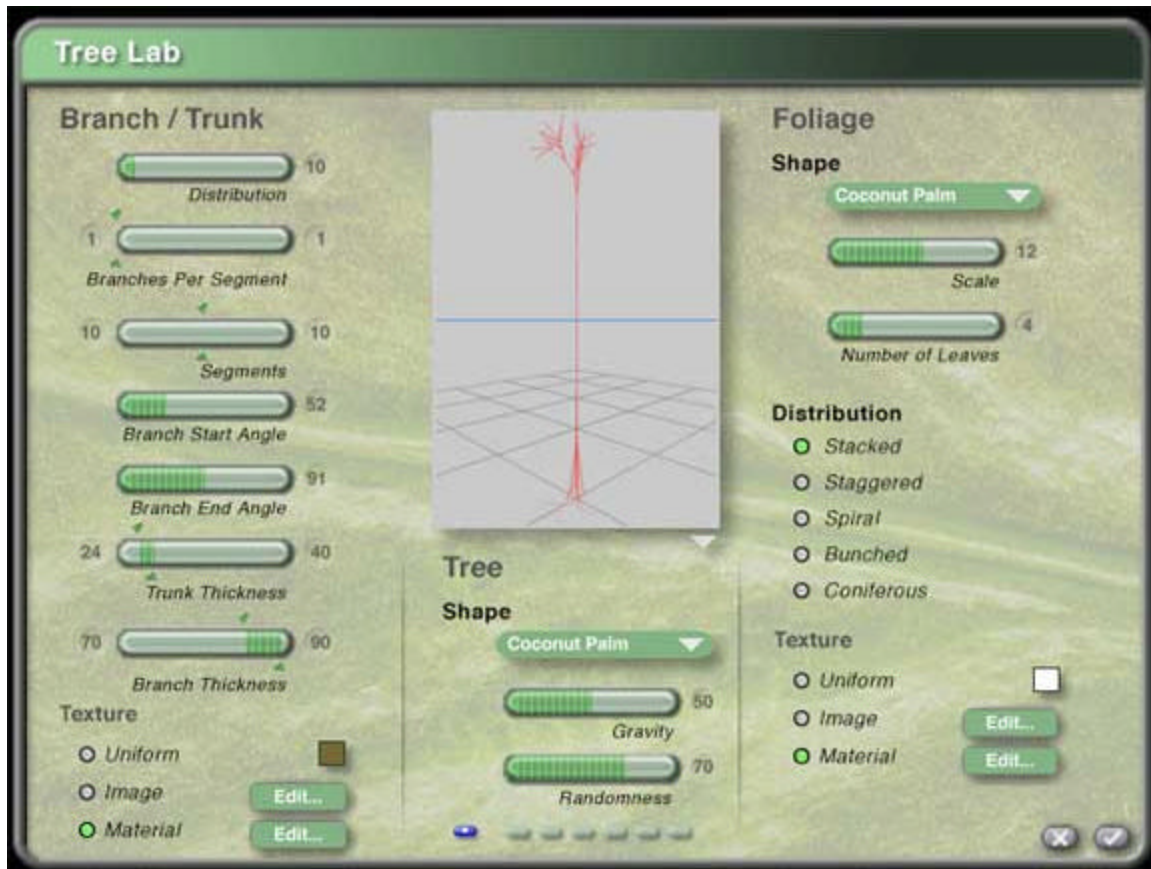
(1) USING THE TREE LAB

The Tree Lab lets the user choose between 60 basic tree types. This controls the overall shape of the finished tree. Parameters such as trunk thickness and the branching angle can be customized to the needs of the project. Each tree type has a corresponding texture applied to the bark. If desired, the user can edit the bark texture or replace it with a different texture. The user also selects the leaf type, size, and color, and how the leaves are arranged on the branches.

For this tutorial, we're going to make a grove of Palm Trees. Start up Bryce and open the Create Palette. You'll see a new icon along the top of the screen – a tree. Click it and you'll have started your first Tree Lab tree. The screenshot below shows a test render of the default tree.



To edit the tree, make sure that it's selected and press CTRL+E to enter the Tree Lab. Two things worth noting are the preview window and the Min/Max controls. The little arrow under the preview window enables a drop down menu which allows the user to update the preview and to choose between a wireframe view and a rendered view. Some of the controls use Min/Max sliders which allow two closely related parameters to double up in a single control.



When you're through exploring, change your settings to match the above screenshot to generate a palm tree. You'll want to click on the Edit button next to "material" in the Foliage section to make sure you're getting the leaf color you want. A test render should look like the following image.



Nothing like a levitating, uprooted palm tree to fuel a need for a landscape. To keep the tree safe until it's needed again, assign it to Family 20, call it Tree1, and save your work.

(2) ASSEMBLING THE PICTURE

Now it's time to generate a landscape that the trees will be growing in. This is done by creating a terrain, modifying it in the Terrain Editor so it can be tiled, and tiling the terrain out toward the horizon. A depression is created in the foreground tile and filled with water to create the oasis. Grass is added using Plant Studio. The Pyramids of Giza were modeled with simple primitives, built to scale, and added to the background.

The Terrain

To get started with this portion of the project, set up your camera as shown below.



This project used a tiled terrain generated entirely in Bryce. To start, create a terrain and click the triangle next to Edit. Select "Riverbed" under the "Rocks & Stones" materials library and click the check mark to accept the material. Press CTRL+M to enter the Materials Lab and modify the default values to match the settings shown below.



Press CTRL+E to go into the Terrain Editor. Under Editing Tools click the little arrow to the right of Fractal and select Perlin Hills. Now, start clicking the button to the left of Fractal until you see something that looks like sand dunes. Set the grid size high for the first tile because it's the closest one to the viewer. I used 2048 but you could probably get by with less. If your machine has memory limitations, use a grid size of 1024 or 512 and change the names of the sand objects accordingly. Accept the terrain by clicking on the check mark.



Assign the terrain slab to Family 2 and call it Sand2048a. Duplicate this terrain by entering CTRL+D. Assign the new terrain to Family 3 and call it sand2048b. In the Edit Palette, click the little triangle next to the size tool and select Flip X to mirror the terrain around the Z axis. Similarly, duplicate sand2048b and assign the new terrain to Family 5 and call it sand2048c. This time select Flip Z to mirror around the X axis. Now select sand2048a, duplicate it, assign the new terrain to Family 6, and call it sand2048d. Select Flip Z. Using the Attributes window for each of the four terrains, set the sizes and positions as shown in Table 1. Congratulations, you've made the first terrain tile. Using CTRL+D, copy sand2048a to sand512a in Family 7. Enter the terrain editor and set the grid size to 512. Likewise, copy sand2048b to sand512b, sand2048c to sand512c, and sand2048d to sand512d and set their grid sizes to 512. Do the same to produce the 128 grid and the 64 grid tiles and set the sizes and positions of all the tiles as shown in Table 1. When you've got it, save your work so you can get back to this point if you have to.

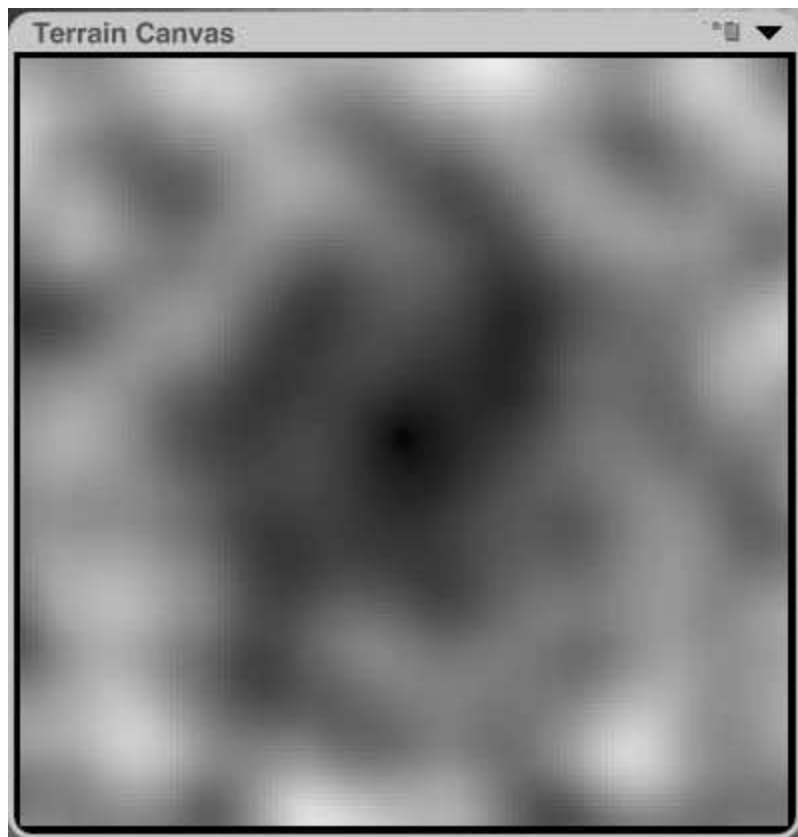
Next we will start copying the tiles and moving each new tile out toward the horizon until they blend in with the ground plane. Select the ground plane and apply the same sand texture that was used for the terrains. Now, select all 4 terrains making up the 512 grid tile, group them together, and assign them to family 7. Do the same with the 128 grid tile in family 11 and the 64 grid tile in

family 15.

Use CTRL+D to start copying the sand512 tile, using the Attributes window to move each new tile by 400 in the X or Y direction. As the tiles get farther away from the viewer, switch to the lower grid sizes. If you've ever tiled a floor, this will seem very familiar.

The Oasis

To make the oasis, select sand2048a and go into the terrain editor. Press Invert and then Blob Maker to make a new hill in the middle of the terrain. Press Invert again and sand2048a is restored to its original shape except for a pit in its middle. The terrain canvas with the pit added is shown below.



Exit the Terrain Editor, select all 4 of the 2048 grid terrains, group them together, and assign them to Family 2. Create a 2D Disk with the values shown in Table 2 and apply a water texture to it. Assign this disk to Family 6 and call it Water.

The Grass

The grass around the oasis was created in Plant Studio, a standalone program that generates 3D models of a wide variety of plants. 27 different models of grass, each with 0 degrees of rotation, were generated in Plant Studio and exported as 3DS files. These models were imported into Bryce as family 5 and kept ungrouped. After selecting family 5, the Attributes window was opened (by clicking the little "A" in the box next to the model) and the grass was rotated 90 degrees on the X axis to correct the orientation after importing. After accepting these values by clicking the check mark, the Multi-Replicate window was opened by pressing ALT+SHIFT+D. The quantity was set to 5 with a rotation of 3 degrees on the Y axis. This resulted in a total quantity of 162 plants whose orientations vary over a range of 15 degrees.

To set the size and rough position of the plants, all of the plants were selected and a top view was chosen. In the Edit Palette, the overall scale of the plants was decreased with the size tool until it looked right compared to the palm trees. The plants were then moved to the side of the oasis seen by the viewer in director view by using the position tool. Still in the Edit Mode, 2D Disperse was chosen from the Randomize Options and the little "amount" button was clicked and dragged to spread out the grass. At this point, a check in director view should show the grass dispersed in a flat horizontal plane at some height above the ground. Keep all of the grass at this height until you're satisfied with its position from the top view. If you change the height of any individual plants at this time, you'll have a very difficult time getting the height of the plants to track the changing terrain altitude when you drop the plants down to ground level later on.

To fine-tune the position of the grass, we need a reference picture of the oasis that we can refer to while moving the grass. We also have to be able to select and move grass individually and in clumps without affecting other objects in the image. To do this, return to a top view and render the image of the oasis. When this is complete, click twice on the little cube on the lower right of your image. This should give you your rendered image with the wireframe overlaid on top of it. Select the oasis terrain slab, click on attributes, and select "Locked". Do the same with the oasis water disk and the ground plane. Now use the mouse to select a clump of grass that is positioned where it shouldn't be (like over the water or too far from the water) and move it to the edge of the oasis. When you are satisfied with the arrangement of the grass, SAVE your work.

To drop the grass onto the terrain, change back to the Directors View, select all of the grass, and click the down arrow icon appearing next to the bounding box. Each grass object should drop down to the terrain. If you're not satisfied with the arrangement of the grass on the ground, then select Revert to Saved in the File menu to restore the grass to its original pre-dropped position.

Repeat the render to make a new reference image, and continue your landscaping work. When you're satisfied with the image in the Director's View, save your work.

Building the Pyramids

The original pyramids took years to make at a cost of untold human suffering. Unless you're a tyrant with thousands of people who obey your every whim, you will probably be better off building them in Bryce. Just create three pyramids using the values given in Table 2.

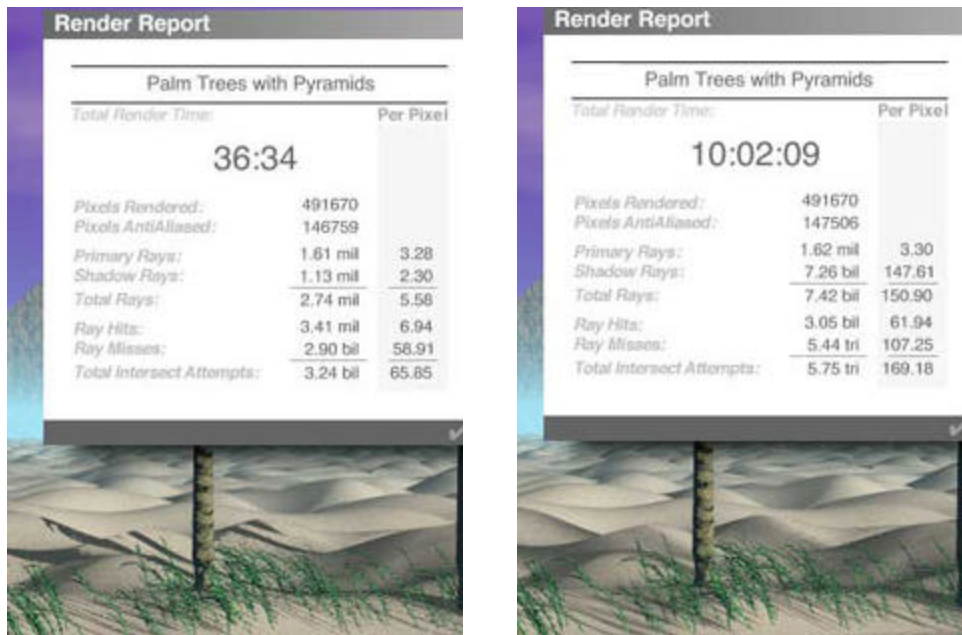
The values for the pyramids were found after a lot of digging on the Internet. Their size was scaled up to match the trees. The average height of a tree object in the Attributes menu was 64. This is easily twice the height of the real tree in feet, so I doubled the dimensions of the pyramids to keep everything to scale. For this picture, one unit in Bryce = 6 inches. The viewpoint in the picture is from the southwest of the pyramids, looking to the northeast, about 1600 feet from the nearest pyramid (Menkaure). In case you're interested, the names of the three pyramids are, from largest to smallest, Khufu or Cheops, Khaefre or Chephren, and Menkaure.

Adding the Trees

Now that you have a suitable landscape built up, it's time to add the trees. Select Tree1 and move it to a suitable location using the Attributes window. Copy Tree1 using CTRL+D, assign the new tree to Family 21, and call it Tree2. Use the same process to create Trees 3, 4, 5, and 6. You can use the tree positions given in Table 2 unless you see something you think would look better. If the trees look too similar, you can change the value of the randomness slider for each tree in the Tree Lab. You can also change the rotation on the Y axis so the tree presents its best side to the viewer.

Comparison between Hard & Soft Shadows

The final image was rendered twice - once with normal shadows and once with Soft Shadows enabled in the Sun and Moon section of the Sky Lab under the Sky & Fog Palette. The resulting Render Reports are shown below with normal shadows on the left and soft shadows on the right.



Rendering was done on a PC with an 850 MHz Athalon processor and 768 MB of RAM. The file size was just under 200 MB with 1048 objects and 52442883 polygons.

(3) SUGGESTIONS FOR FUTURE UPGRADES TO BRYCE

I haven't walked through everything that's new in Bryce5, but what I've seen so far looks good. The new soft shadow feature can really enhance the realism of an image. The sharply outlined shadows produced by earlier versions of Bryce could make an image look overly stark unless a lot of care was taken. The new TreeLab is a great addition. It can produce some nice results, but I wish they'd taken it a little further. What follows is a wish list of features that I'd like to see incorporated into a future version of Bryce.

Tree Lab Suggestions

Currently, tree trunks are straight. It would be great to add the ability to bend tree trunks.

The joint between the root section and the trunk produces a bulge near the bottom of the tree. If this could be minimized it would help.

The ability to export the tree as a 3DS or OBJ file would allow the user to paint or otherwise edit the tree before importing back into Bryce for final rendering.

The user can determine the effects of gravity on the tree. However, gravity

Family	Name	Pos X	Pos Y	Pos Z	Gain X	Gain X	Gain X
1	<i>default</i>						
2	sand2048a	0.00	10.12	0.00	200.25	20.00	200.25
3	sand2048b	-200.00	10.12	0.00	200.25	20.00	200.25
4	<i>lights</i>						
5	sand2048c	-200.00	10.12	200.00	200.25	20.00	200.25
6	sand2048d	0.00	10.12	200.00	200.25	20.00	200.25
7	sand512a	-400.00	10.12	0.00	200.25	20.00	200.25
8	sand512b	-600.00	10.12	0.00	200.25	20.00	200.25
9	sand512c	-600.00	10.12	200.00	200.25	20.00	200.25
10	sand512d	-200.00	10.12	200.00	200.25	20.00	200.25
11	sand128a	-800.00	10.12	0.00	200.25	20.00	200.25
12	sand128b	-1000.00	10.12	0.00	200.25	20.00	200.25
13	sand128c	-1000.00	10.12	200.00	200.25	20.00	200.25
14	sand128d	-800.00	10.12	200.00	200.25	20.00	200.25
15	sand64a	-1200.00	10.12	0.00	200.25	20.00	200.25
16	sand64b	-1400.00	10.12	0.00	200.25	20.00	200.25
17	<i>camera</i>						
18	sand64c	-1400.00	10.12	200.00	200.25	20.00	200.25
19	sand64d	-1200.00	10.12	200.00	200.25	20.00	200.25

Table 2

Family	Name	Pos X	Pos Y	Pos Z	Rot X	Rot Y	Rot Z	Gain X	Gain Y	Gain Z
2	sand2048	-100	10.12	100	0	0	0	400.25	20	400.25
5	grass									
6	water	0	4.50	0	0	0	0	200.00	0	200.00
7	sand512	-500	10.12	100	0	0	0	400.25	20	400.25
11	sand128	-900	10.12	100	0	0	0	400.27	20	400.27
15	sand64	-1300	10.12	100	0	0	0	400.30	20	400.30
16	pyramid 1	-8233	485	10253	180	-88.50	180	1511	970	1511
18	pyramid 2	-5855	477	8120	180	-88.50	180	1412	944	1412
19	pyramid 3	-3286	215	6612	180	-88.50	180	692	430	692
20	tree 1	-1.79	30.30	97.90	0	15	0	30.27	62.85	29.09
21	tree 2	-23.64	35.79	67.84	0	15	0	34.58	81.22	34.06

22	tree 3	28.04	35.92	-35.32	0	45	0	32.49	80.49	34.05
23	tree 4	-3.95	25.73	45.85	180	0	180	31.81	59.83	30.81
24	tree 5	-30.71	34.55	50.23	0	90	0	30.70	72.29	29.57
25	tree 6	-58.13	36.35	30.57	0	0	0	28.80	75.62	30.12

This tutorial started out as a brief look at the Bryce 5 Tree Lab and it just grew from there. A lot of the techniques covered here can be applied to other types of projects in Bryce as well as other 3D applications. Good luck with your landscaping work and enjoy.