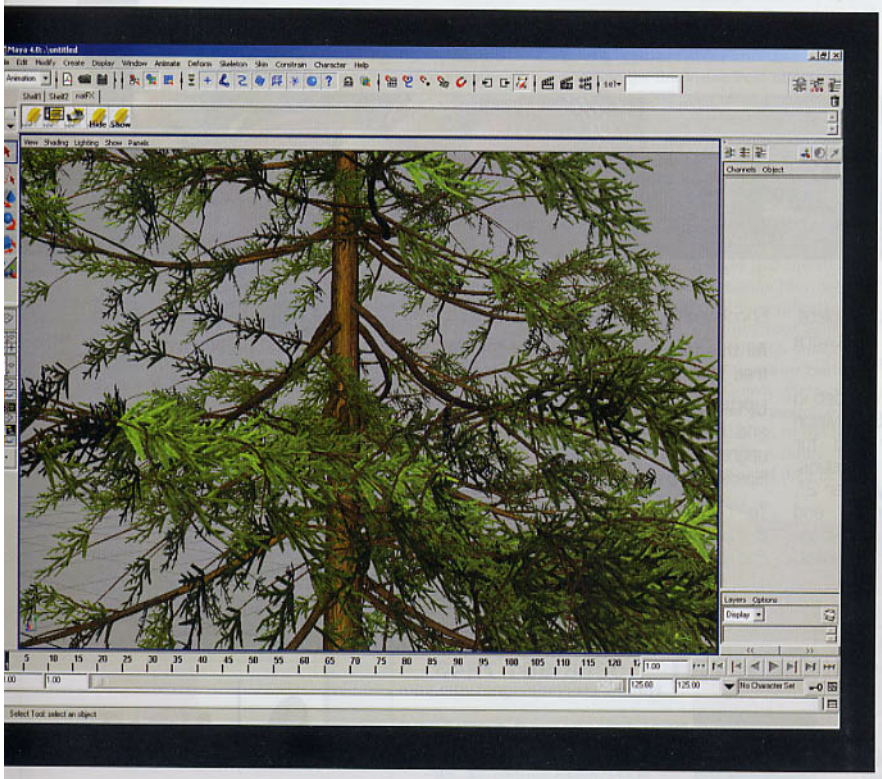
Branch plant

IN THE PAST, CREATING A CG TREE THAT REFLECTED A SPECIES' AGE AND SEASONAL COLOURS WAS ALMOST AS SLOW AS WATCHING ONE GROW IN THE REAL WORLD. NOW FRENCH COMPANY BIONATICS IS OFFERING MAYA USERS A TOOL TO CREATE A VARIETY OF SPECIES THAT NOT ONLY CONVEYS MATURITY AND SEASONAL INFLUENCES, BUT WILL REACT TO ENVIRONMENTAL STRESSES LIKE WIND TURBULENCE



This tutorial follows the demo version of Natfx that can be downloaded directly from our site at www.bionatics.com. It presents the main features of Natfx and is divided into three sections. In the first section we'll animate the tree. In the second section we'll have the leaves rustle about in a light breeze. And in the third section we'll crank up our wind and have our leaves fly away. But first a little introduction.

Natfx is a plug-in for Maya based on AMAP technology. AMAP, what's that, you say? Developed by the CIRAD (www.cirad.fr), a French scientific organization specialising in agricultural research for the tropics and subtropics, AMAP combines computer science and botany and takes the expression of a plant's genetic information and automatically generates its model. Natfx, therefore enables the user to animate richly textured complex plants such as trees, bushes and flowers with ease. What makes Natfx unique is its capacity to easily and quickly animate all aspects of a plant. Botanic parameters are automatically calculated for each particular model meaning that the flexibility of its wood, leaf attachment strength and stem strengths are faithfully reproduced for each individual plant. However, users can easily bypass the constraints allowing them to animate the model as they see fit.

All Natfx's plants and trees are delivered fully-textured and their geometries and skeletons are automatically generated. Reproduce one plant an infinite number of times, at different ages, in different seasons and each individual will be unique with its own behaviour relative to its real-life equivalent. Use the botanic tuner to place the plant anywhere on the seasonal spectrum and modify its age. Adjust detail levels and scale individual elements of a plant in the geometric tuner. Tight integration enhances the

BY NIKOLAJ NIELSEN

overall effectiveness of Natfx, thus providing the user with an efficient and well-defined tool. For instance you can go into the Outliner or use Maya's Hypergraph to visualize the model's structure.

Natfx is constantly evolving. At present, it includes about 50 available plants from around the world. This database is being enriched and updated on a regular basis. But this database will not be limited to plants that exist today. Alongside Bionatics, CIRAD researchers will eventually release virtual "seeds" containing prehistoric plant and tree genetic information, meaning you'll be able to animate and watch a Tyrannosaurus Rex smash its way through the dense prehistoric foliage that actually existed in that era.

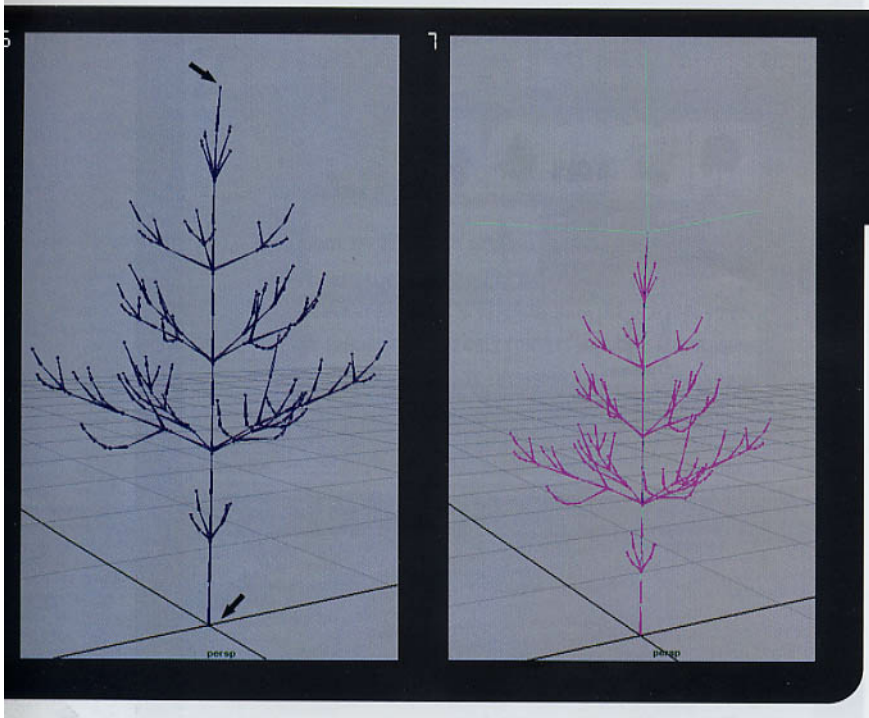
Take a look at the interface featured in *Fig 1*. It's pretty straightforward. The nursery houses your plant library of virtual seeds. The demo only allows you to animate an eight year old Horsechestnut tree but then again, it is a demo. Below the Nursery panel you have the Alchemy panel where you get to concoct your model by determining its age, season and complexity. Right of that, you'll find the Information panel where you'll get some specs on your model, such as polygon count. Above it, you have Quantity, where you can determine how many different Horsechestnuts you'd like to create. Because the tree is unique every time you generate one, it's a good idea to set quantity to three, that way you can select the best one from the Preview box.

PART ONE: ESTABLISHING ROOTS

1. Click Create Life! to generate your three Horsechestnuts.

Once you've selected the one you like, click the 'Send to Pool' button. No need to explain what this button does. The Pool is

WITH NATFX YOU CAN CHOOSE THE YEAR AND SEASON OF OVER 50 PLANTS



NATFX MOUSE FUNCTIONS ARE IDENTICAL TO MAYA'S MINUS THE ALT

where you keep your personalised plants on hand. With your Horsechestnut selected in the Pool Panel, click the 'Plant Tuner' button. The Plant Tuner box appears with your Horsechestnut and the word 'demo' written across the back. NatFX mouse functions are identical to Maya's minus the alt. So, if you want to zoom, pan or rotate the tree just follow your Maya instincts.

2. Check 'Prepare Wood for Animation' and 'Permit Animation' and then click the 'OK' button [*see Fig 2*]. This will take you back to the interface where your Horeschestnut has taken on the parameters you established in the Plant Tuner.

3. Click the 'Mayatise!' button.

This sends your model into Maya's workspace and minimises the interface. As you can see, the Horsechestnut is in a simplified 'billboard' form [a single polygon with a semi-transparent image on its face] which is fine, but if you want to see the tree in its fully textured mode we'll have to load its geometry.

Click the first Natfx icon on your shelf to re-open the interface then click 'Materialise' to load the geometry. Once the geometry is loaded, click the 'Hide Natfx' button.

Okay, we still have our billboards, but try zooming in on your tree. As you get closer the tree's geometry will pop into view. This is a particularly cool feature when you're working with many plants in one scene. Moving billboards around is a lot quicker than full geometries. Of course you can determine at what point you want your billboard to pop into view by using Natfx 's level of detail [LOD]. We don't really need the billboards, so we'll just increase our LOD.

Click the second Natfx icon on Maya's shelf [*Fig 3*]. Set the LOD to 8. You'll want to see the textures as well so press 6 on your keypad (make sure your number lock is activated) [*Fig 4*].

Now that we have our tree, we'll want to animate it. Let's just work with the essentials.

6. Select Show and click 'None' from the list then activate Nurbs Curves, Joints, IK Handles and Pivots [*Fig 5*].

7. Grab your IK Spline Handle Tool and click the top of the tree and then its point origin [*Figs 6 and 7*].

8. With the spline set and your CV points visible, select the Move Tool. Be sure the "select by component type" is activated from Maya's Status Line. Then with the Move Tool select the top CV point. A manipulator handle will appear [*Fig 8*].

As you can see from the image, I've set the End Time to 125. With 25 frames per second, this will give me a 5 second animation. While we're at it, I find it better to set the Playback Speed to Half (12 fps) in the Preferences. This way, running a playback, we get to view the dynamics of leaves rustling about as the limbs move.

9. Now the manipulator handles are ready to get manipulated. So, with our Current Time indicator at 1, set a keyframe.

10. Go to frame 25 and pull the handle to the right and then place another key.

11. Go to frame 50 and pull the handle back to the starting position and set a key.

12. Go to frame 75 and pull the same handle to the left, set a key and repeat step 11 but on frame 100 [*Fig 9*].

That's it. Well not exactly. You'd probably like to see the animation. Go to Show, deactivate everything except the polygons and you'll see your fully textured Horsechestnut appear. Run a playback and if you like what you see, run a playblast as well. By the way, you're not limited to setting splines on

just the trunk, you can also set them on the branches [*Fig 10*].

That ends part one. Obviously it's up to you as an animator to animate the tree as you'd like. You can also go into the Outliner or use the Hypershader to access the structure of the tree. We'll be doing that in the second half of the tutorial where we'll set a simple Turbulence field on the leaves to have them rustle about in the wind. We'll then increase our virtual wind to a wild gust that blows all our leaves away.

PART 2: A HUFF AND A PUFF...

First of all you'll have to set up a new scene in Maya. Save your current scene if you want and then with Maya's workspace cleared repeat the first two steps. Be sure to check "Enable Leaf Flight" and send the Horsechestnut with its full geometry into Maya (see above instructions).

To access Maya's Turbulence features you'll have to set Maya to Dynamics mode. We also need to get to the particles in the tree, so open up the Outliner.

1. Go to the very last listing in the Outliner : natFX_particlesForHorsechestnut_a and open it. In it you'll see four particles. Select the first three.

2. Next, select Fields>Turbulence and open up the options box.

3. Set Magnitude to 10.00, Attenuation to 0.25, Frequency to 1.00, Phase X to 20.00, Phase Y and X to 0.00, Noise Level to 10 and Noise Ratio to 0.700 and then click 'Apply'.

A Turbulence icon will appear in the Outliner. Close your Turbulence Options box and then do a playblast. The leaves should be rustling about. If you want less movement on your leaves, increase the Attenuation a bit. Take a closer look at your leaves and you'll notice that they are independent of each other. Like in the animation before, the leaves carry an inertia creating a realistic effect. Now, what about having the leaves fly away? Well, because the leaves are dynamic and are particles, you can modify their Goal Weight in the Channel Box. This is an easy way for your leaves to fly away all at once. Of course, it would probably be a good idea to set our tree in Autumn, but then again we'll just have to suspend disbelief and pretend, after all this is a demo and our lonely Horsechestnut is stuck in Spring.

PART 3: ... AND I'LL BLOW YOUR LEAVES AWAY !"

Let's create a stronger wind. Go into the Outliner and delete your Turbulence Field. Then repeat the first two steps above and set Attenuation to 0.00 in the Turbulence Field Options box and click 'Apply'.

1. Open up the Outliner and select "particlesForHorsechestnut_aLODForLODForHorsechestnut_a_2". Again, this is found in the very last listing in the Outliner along with the three other particles. You'll notice that a long list of variables and parameters appears in the Channel Box. There is only one parameter that interests us and that is the Goal Weight (0).

2. This can be a bit tricky so follow these instructions word for word. Go to key 25 and then select Goal Weight(0) in the Channel Box. With your mouse over the selected Goal Weight(0), press the left mouse button and you'll see a list. From the list, select 'Key Selected'.

3. Now go to key 26 and go back to Goal Weight (0) and change its setting to 0. Press the left mouse button and select "Key Selected" from the list.

Okay. That's it. Do a playback and when the key gets to 26 all the leaves will detach and fly away. If you're happy with the results, create a playblast. Well, what about the tree? The leaves rustle about and then detach, but why is the tree static? Natfx is a tool giving you the essential elements to create amazing animations so it's up to you as a Maya user to put those together. What we've seen here is how to animate the trunk, how to place a Turbulence Field on the particles and how to have the leaves detach. Put those three together and you'll have some astonishing results. Like I mentioned earlier, Natfx is perfectly integrated into Maya. Don't hesitate using Maya's tools, like Maya's Painteffects, to enhance Natfx [*Fig 11*].

So that's it. If you have any questions or comments please don't hesitate to contact us. Since the release of this demo, important updates may have been made to natFX. Bionatics is continuously improving its technology. For example, you'll soon be able to deform or remove bones on the skeletons among other things. For updates, just check out the site at www.bionatics.com. ◘

NIKOLAJ NIELSEN IS BIONATICS' IN-HOUSE JOURNALIST.

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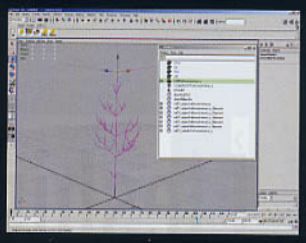

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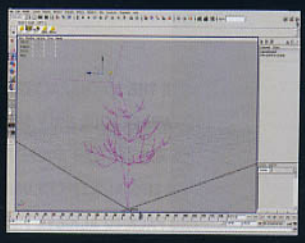

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