

● Using *Cloth*, you can create an entire wardrobe for your 3D characters - the only problem you'll have is deciding what they're going to wear

3DS MAX

# Prêt-à-porter

This tutorial gives you one of the first opportunities to try out 3ds max's new cloth-creation tools - they're free to registered users

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## FACTFILE

### FOR

3ds max and Cloth/  
clothFX

### DIFFICULTY

Intermediate

### TIME TAKEN

One hour

### ON THE CD

- Start and Finish  
MAX files
- Full-size screenshots
- Final animations



Discreet recently gave away *clothFX*, which was previously a third-party plug-in, as part of its subscription service to registered 3ds max users. Under the slightly revamped title of *Cloth* it adds a simple-to-use and more adaptable clothing solution to max's arsenal than the existing *Cloth* dynamic, which is available through *Reactor*.

As well as offering a very robust physics simulation with a wide variety of preset variables, *Cloth* also provides a means of constructing articles of clothing from scratch using traditional tailoring techniques. This approach opens up whole new levels of possible detail and realism in terms of what your characters wear, with complex, multi-textured fabrics and constructive forces such as Seam Strength and Crease Angles affecting the way in which material moves.

This tutorial will introduce you to the three main aspects of *Cloth*, starting with a look at how different *Cloth* settings provide subtle and impressive variation between geometry when a dynamic simulation is applied. We'll then cover the use of existing modelled

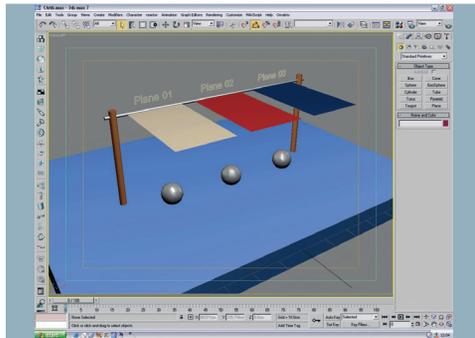
geometry as a piece of clothing is applied to an animated biped. Finally, we'll start tinkering with *Cloth's* Garment Maker tools to get a glimpse at what can be achieved when you take the tailor-made approach to 3D character dress making.

Once you've got the hang of it, *Cloth* is a very useful bit of kit. Its subtle and realistic movements can really bring animations to life and, when it's used for complex layered cloth, the results can almost steal the scene. So have a play, get hooked and start making your very own fashion statements - don't just hold *Cloth* in reserve for whenever you need a flag blowing in the wind! And if you're not a 3ds max subscriber, don't throw this tutorial away - in the past new features made available to subscribers have been incorporated into future releases of the software. This issue's CD contains full-size screenshots, Start and Finish .max files for each section of this tutorial and rendered animations of the final effects.

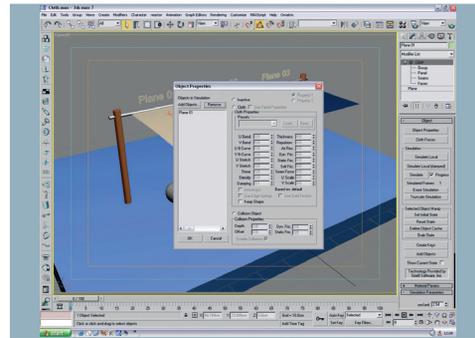
Chris Ollis works as an animator at Codemasters. His winter collection went down a storm at Paris Fashion week...  
[w] [www.InterTwined.co.uk](http://www.InterTwined.co.uk)



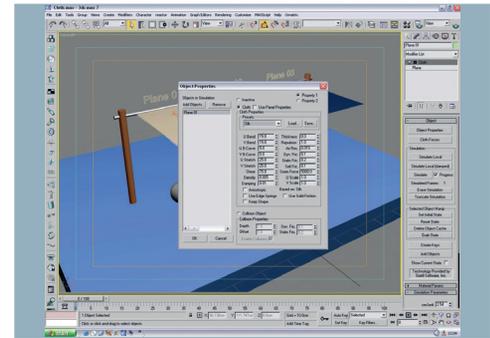
## STAGE ONE | Understanding the differences in cloth types



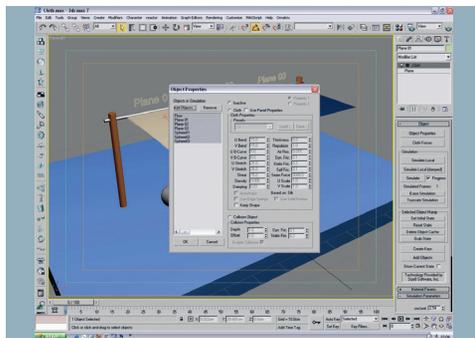
**01** The first thing we'll do is look at the Cloth modifier itself. We'll apply it in its most basic form to some simple geometry, and observe the results. While this doesn't sound very exciting, it actually provides some instantly entertaining results, and demonstrates the variation between cloth types. Load up the file Cloth\_pt1\_start.max from this issue's CD and we'll begin.



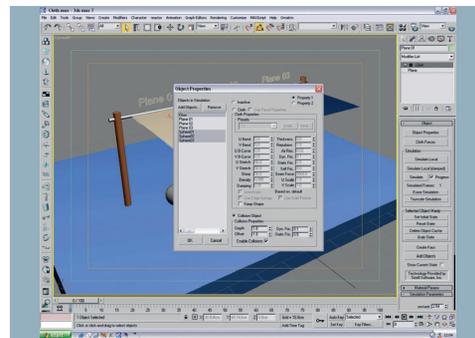
**02** The scene contains three plane objects, a bar and a selection of collision objects. Select the first plane (Plane 01) and, from the Modifier List, select the new Cloth modifier. From the top of the panel, select Object Properties to bring up a new window; this window will be used to display all the cloth objects and associated geometry in the scene.



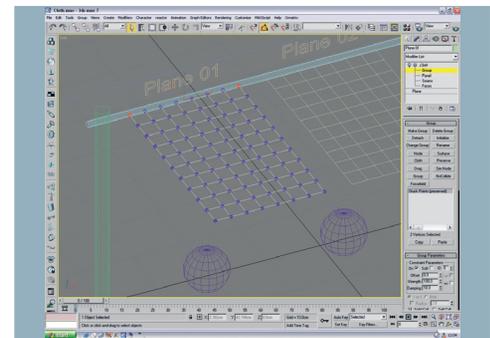
**03** In this new window select Plane 01, and click the radio button next to the word Cloth. The various cloth parameters will become active; from this list you can adjust the properties of your object to simulate the multitude of cloth densities, flexibilities and weights. But we'll keep things simple for now; click on the Presets drop-down menu and select 'Silk'.



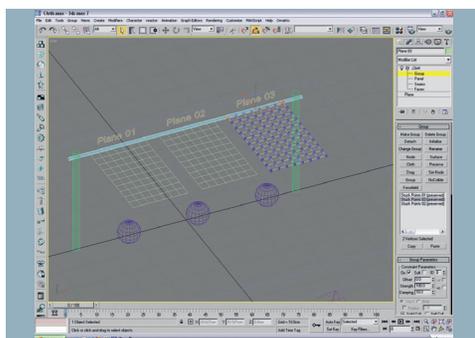
**04** You could apply a separate Cloth modifier to every cloth object in the scene but, to keep things simple and accessible, we'll work within this first window. Click on the Add Objects button in the top-left corner and select 'Plane 02', 'Plane 03', 'Floor' and the spheres from the list. Now select 'Plane 02', click the Cloth radio button and pick 'Rubber' from the Preset list.



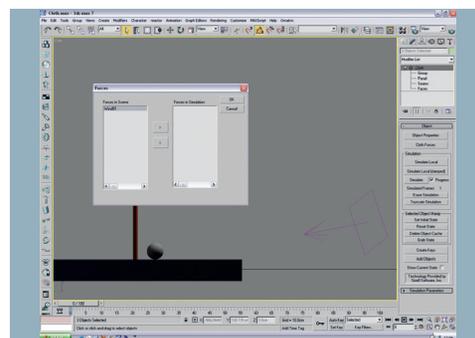
**05** Do the same for Plane 03 and select 'Heavy Leather' from the presets. Finally, select 'Floor' and the sphere objects but, this time, we'll make them collision objects by selecting the radio button at the bottom of the window. Again, new options are available, but we'll leave them for now. Hit OK to close the window.



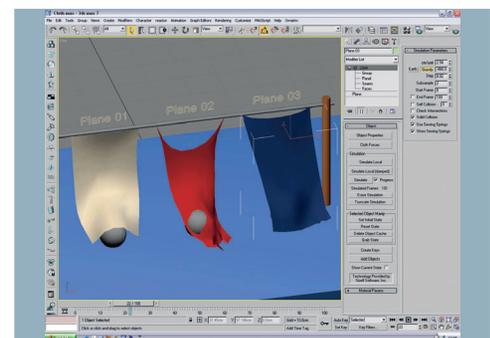
**06** Before we see how the cloth behaves, we'll attach it to the bar. Select each plane in turn and, under the sub-objects of the Cloth modifier, select 'Group'. The plane's vertices become available; select the two corner vertices nearest the bar then press the Make Group button. Call the group Stuck Points. Click OK and then press the Preserve button.



**07** This basically tells the Cloth modifier to ignore the selected group of vertices, leaving them to do whatever it was they were doing before it got involved - in this case, nothing. Repeat this process to attach Panel 2 and 3 to the bar by their corner vertices. Once the panels are attached you can drop out of Sub-object mode and return to the main options.



**08** The last thing we'll do is add an external force. Select the Cloth Forces button from the Modifier panel and add Wind01 from the list. That's it: we're now ready to go. Hit the Simulate button, and sit back while max calculates the way the three samples of cloth behave. If you have a slow machine this could take a minute.



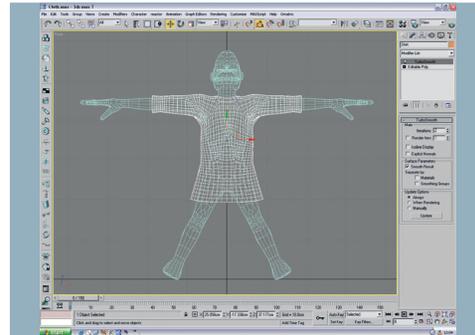
**09** Chances are the cloth will pass through the spheres slightly. Don't panic; this is easily remedied by increasing the number of collision calculations performed per frame. Raise the Subsample value to 2 or 3 and hit Simulate again. To see how it should turn out, load up the file Cloth\_pt1\_finish.max.



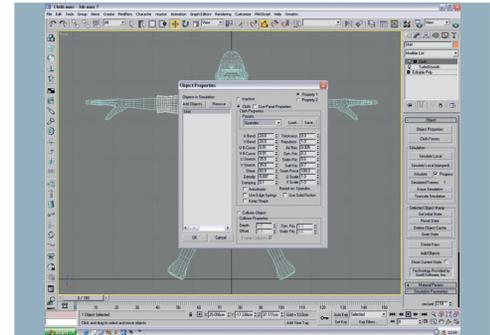
## STAGE TWO | Dressing a character with standard geometry



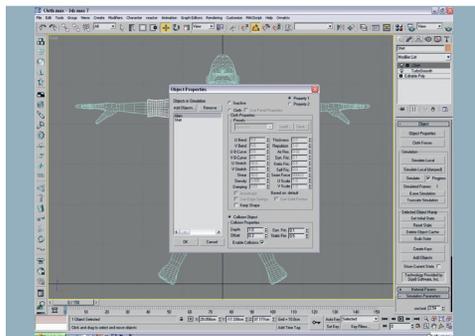
**10** Load up the file Cloth\_pt2\_Start.max from this issue's CD. The file contains a simple model of an alien, which has been rigged with a *character studio* Biped and then quickly animated. The animation should be sufficient to demonstrate the natural motion of the new Cloth modifier; scrub through the frames to see what he does.



**11** The Shirt object was quickly created by duplicating the alien's skin, and then adding a Push modifier to expand it slightly. A TurboSmooth modifier has been added as well to provide some extra geometry. Don't worry about your mesh being too complex when working with Cloth; while your computer may slow down and not like it, the modifier itself prefers the added detail.



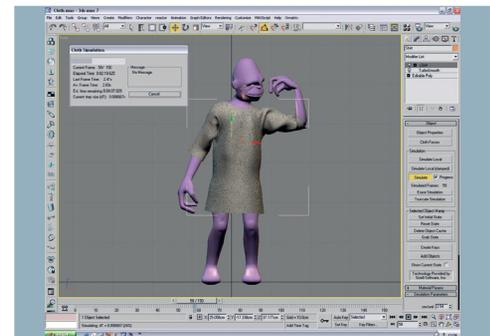
**12** Select the Shirt object and apply a Cloth modifier. As before, select 'Object Properties' from the top of the Modifier panel. In the new window select the Shirt object and click on the Cloth Radio button then, from the Preset list, select 'Spandex' to provide the shirt with a slightly stretchy quality.



**13** Next, click the Add Objects button and add the Alien model itself. This will be our collision object. Drop the Offset value under Collision Properties down to 0.3, so the cloth sits closer to the skin. Close that window, and click the Simulate Local button. This will perform the dynamic simulation on the current static scene, and will help to start the cloth in a natural position.



**14** Once the shirt has finished moving, switch off Simulate Local and we'll now perform the full thing. Click the Simulate button, and sit back to watch the cloth work itself out. Once the simulation is complete, scrub the timeline to see the material slip and fold around the character. It really is a satisfying process when it all moves in such a believable way.



**15** You should quickly see why using a cloth simulation is far better than just relying on a skinned geometric object. The way the mesh hangs and sways is almost impossible to create through rigging or morphing, and the natural slipping around the shoulder and elbow joints makes the unsightly pinching and twisting of meshes a thing of the past.



**16** Next we'll add a little detail. If you haven't found this already, go to the Display Panel and unhide the object called Pockets. We'll now add this geometry to the shirt using the Skin Wrap modifier. It's a very easy way to quickly add collars, cuffs and other features without worrying too much about solving more cloth.



**17** Make sure the timeline is back to 0 so that the shirt is in its original state. Select the pockets' geometry, and grab a Skin Wrap modifier from the list. In the parameters section of the Modifier panel, click on Add and select 'Shirt'. Give Skin Wrap a second or two to work it out, and that's it. Scrub the timeline again to see the results.

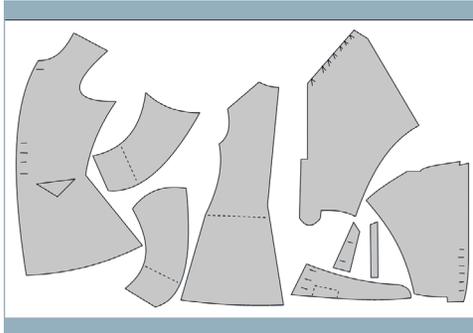
### EXPERT TIP

#### Adding depth

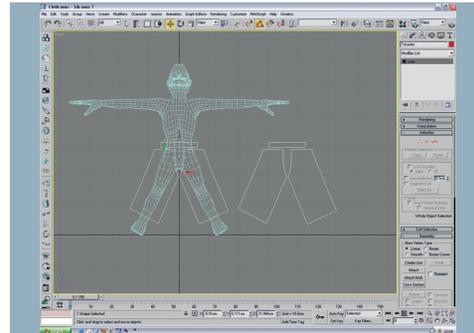
To add instant depth to your cloth, simply apply a Shell modifier. For this Tutorial I recommend setting the Inner Amount to 0.2 and the Outer Amount to 0.0. This will provide sufficient thickness, and stop the geometry from being one-sided; it shouldn't need any segments or bevelling. To add even more detail to your Cloth, simply apply another TurboSmooth on top of the calculation. If need be, drop the Iterations down to 0 and put the Render Iterations up to stop your computer slowing down.



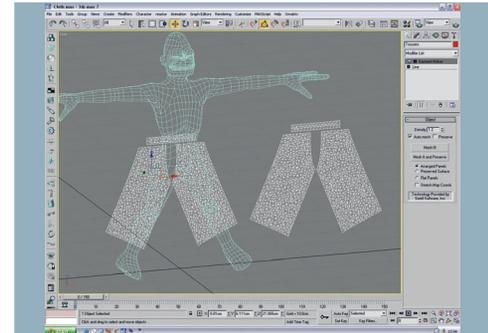
## STAGE THREE | Making your own clothes with Garment Maker



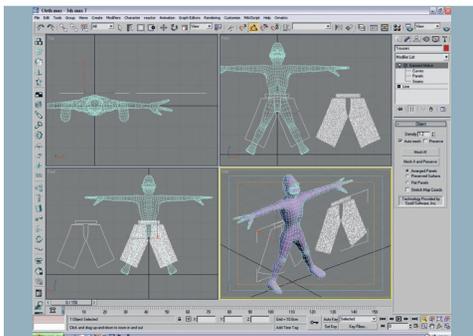
**18** To get the most out of *Cloth* you should really make your own clothes using the 'traditional tailoring' method. You're probably aware of the way in which most items of clothing are made up of carefully cut panels - well, *Cloth* uses exactly the same principle for building items of clothing.



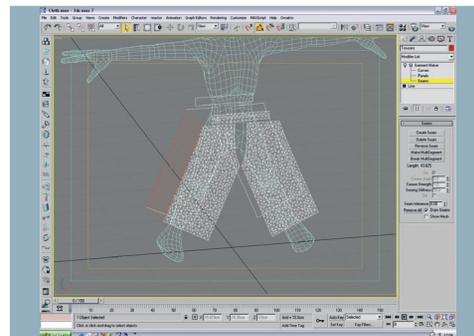
**19** To save a lot of time, load the file *Cloth\_pt3\_Start.max* from this issue's CD. It contains the alien character with the same rigging and animation as before, plus some spline shapes laid out which will form the basis for a pair of trousers. If you can, get hold of some proper clothing patterns - they'll make this aspect of working with *Cloth* a lot easier.



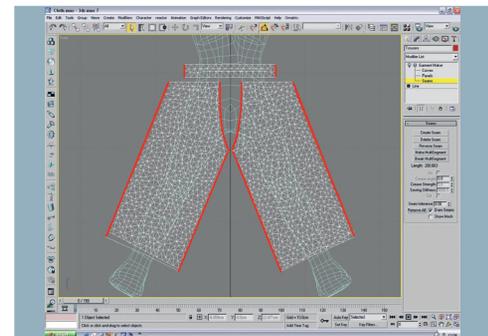
**20** The first thing to do is apply the Garment Maker modifier to the panels. Select the Editable Spline object and add the modifier from the list. The splines will become panels with a crazy kind of tessellation across them. This almost random fragmentation creates a more realistic type of cloth than careful quad arrangements. If your PC can handle it, you can increase the density for finer results.



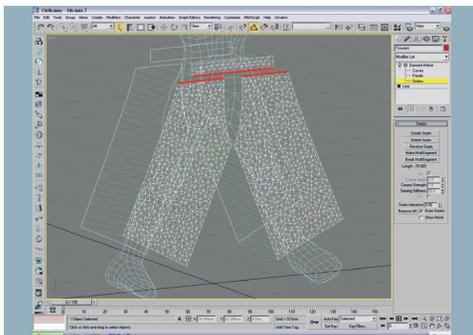
**21** Now let's put the pieces in place. Select the Garment Maker sub-object panels, and rotate the three nearest the Alien so they're backward-facing (make sure you maintain the positions - see the grab above). Due to *Cloth* objects being one-sided, they'll appear to vanish as you rotate them!



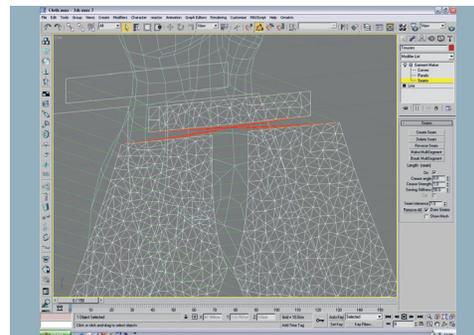
**22** Select 'Seams' in the Garment Maker Sub-objects, and select one of the long outside edges of the trousers; it should turn red. Now hold down [Ctrl] and select the matching back-facing edge. Hit Create Seam and the red lines will join the two together.



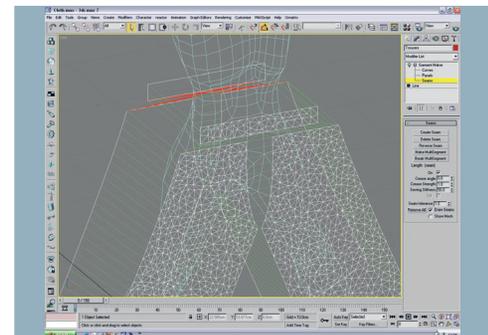
**23** Select the other edges as shown in the screengrab and repeat the procedure. Imagine you're sewing these pieces together and you'll understand which bits should connect to which. You obviously don't want to sew up the leg holes, although for now we'll stitch together the zipper area!



**24** To attach the waistband to the front leg section you'll first need to create a multi-segment. Select the two top edges of the front leg panels. Click the Multi-segment button to basically make this one long edge. You can now select this edge (and the one on the waistband) and then apply a seam. This may throw up an error or two...



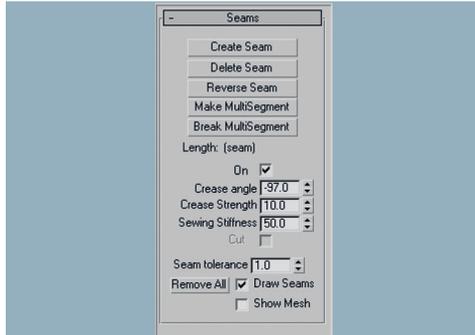
**25** The first possible problem is that the seam tolerance may be too low. To fix this simply drag the spinner up to 1.0 and try again. The next problem is that it may mis-read the direction of the seam, producing a series of connecting red lines that cross over each other. If it does this, press the Reverse Seam button.



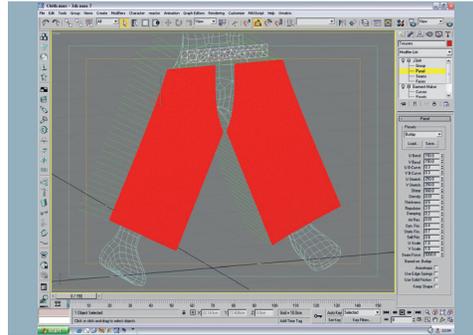
**26** Once you've overcome those problems, sort out the back of the trousers where the matching piece of waistband meets the tops of the leg panels. This will no doubt throw up the same errors as before, so repeat the fixes in step 25. Once those seams are complete, we're ready to proceed.



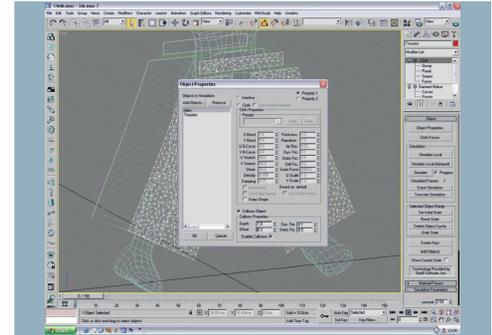
### STAGE THREE (Continued) | Making your own clothes with Garment Maker



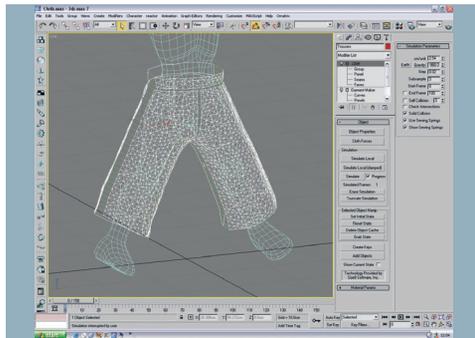
**27** While we haven't got time to go into them in detail, it's worth mentioning the Crease Angle, Strength and Sewing Stiffness options that are available in the Seams panel. These settings affect the way in which the cloth object is pulled by its edges. Using these settings you can force the angle of a shirt collar, or simulate that stiff fold of denim that runs down the sides of a pair of jeans.



**28** We'll now apply a Cloth modifier. Open the Object Properties window and set the Trousers object to be Cloth. This time check the Use Panel Properties box and press OK. Now select 'Panels' from the Cloth Sub-objects and highlight the two parts of the waistband. From the list choose Generic Heavy. Select the four legs panels and choose Burlap from the next list, then drop out of Sub-object mode.



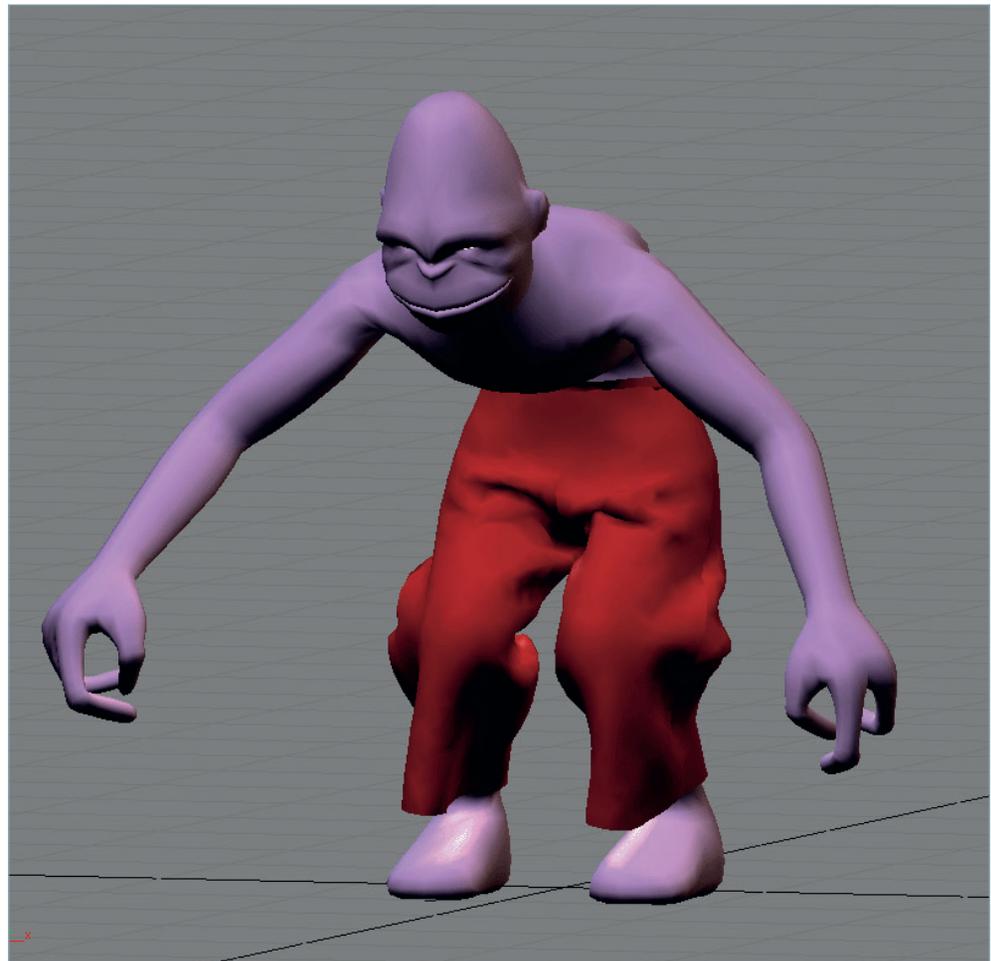
**29** We'll need a collision object to wrap our trousers around, so re-open the Object Properties window, select 'Add Object' and grab the Alien. As before, drop the Offset level down to about 0.3 so that the cloth will get a little closer to his skin. With that done, close the window and get ready to do some local simulation.



**30** Make sure Use Sewing Springs is switched on, and that Gravity is switched off from the Simulation Parameters. Click the Simulate Local button, paying close attention to what happens. The Panels will move together, forming the trousers. When they're almost touching, click the button again to stop the Simulation. Switch off Use Sewing Springs and then continue using the Local Simulation (damped) button for more control.



**31** Let the panels move in until you're happy with their shape. It's sometimes good, at this point, to turn Gravity back on to add a little more natural hang. With that done, we can finally apply the full Solve. Hit the Simulate button to see your garments move with the character's actions. Hopefully the trousers won't come off, otherwise you'll have to make a belt...



**32** As before, you can apply a Shell and TurboSmooth modifier to enhance the simulation with some visual depth. While the results you hopefully see before you are impressive, I must reiterate that this is just the basics of clothing creation. But, with these principles sorted out in your head (and perhaps a book of sewing patterns under your arm), you can move on to start creating shirts, dresses,

jackets and well-tailored suits. Don't just stop at dressing a couple of characters, however - cloth effects can be used for all kinds of 3D projects: fabric draped over cars in showrooms, loose skin on monsters, dynamic hair simulation and, yes, even the obligatory curtain or flag blowing in the wind. Embrace *Cloth* firmly and you'll quickly find that the fashion world is your oyster. ●