

Step by step

Easy-to-follow guides take you from concept to the final render



Mouhsine Adnani

Personal portfolio site
www.mouhsine-adnani.com

Location USA

Software used 3ds Max, nDo2, Photoshop, Marmoset Toolbag

Expertise Mouhsine specialises in creating environments and props for games

Create a tileable texture for game environments

Sci-Fi Corridor 2014

“Here you will learn how to create tileable textures to build *Mass Effect*-inspired sci-fi environments”

Mouhsine Adnani is a senior 3D environment artist, and has been working in the videogame industry for over five years

In this tutorial, I will take you through the major steps required to create a sci-fi environment for next-gen games, using mainly tileable textures. I will only focus on one texture because exactly the same technique applies to the rest of the textures in the scene.

We will be using a technique called flat mapping. For all of the modelling we will be using 3ds Max (though you can use any other 3D package) and Photoshop for texturing. We'll also be using nDo2 and Marmoset Toolbag 2.0 for rendering the scene in real time. The aim of this tutorial is to show you what I consider to be one of the best techniques to create great-looking tileable textures.

Concept

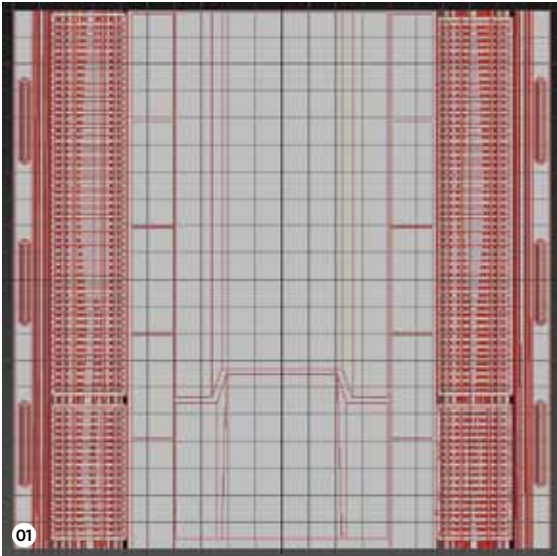
The concept of this scene is mainly inspired by *Mass Effect*. To create it, I looked at a series of screenshots and hopefully came up with something similar to its style.

Learn how to

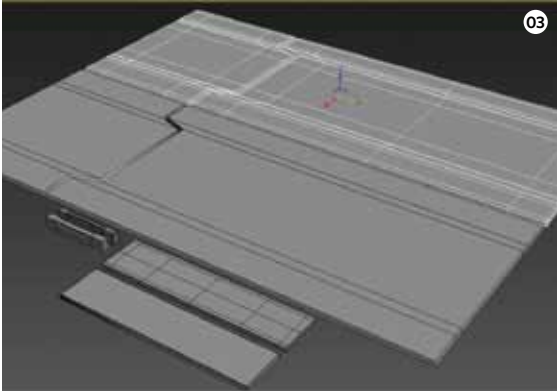
- ✓ Block out a floor for tiling
- ✓ Create a high-poly floor
- ✓ Project the floor to get maps
- ✓ Use nDo2 to speed up your workflow
- ✓ Set up a scene in Marmoset Toolbag

With the Disc

Tutorial files:
• MAX file and textures

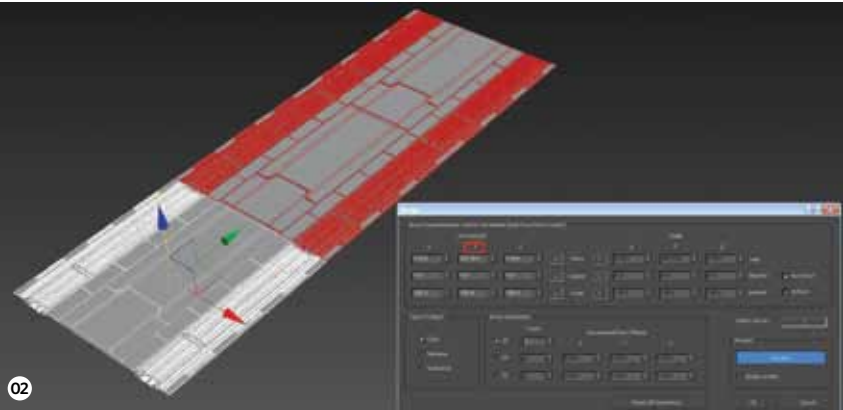


01 Block out and tile First of all, we'll want to play with some simple shapes until we get something that looks interesting. Make sure your grid is set up to metres – it will make the tiling easier when duplicating meshes to make sure they continue to tile correctly. For my scene, I set the floor to 2m by 2m. Keep everything centred within the grid for symmetry purposes. A model like this can get overwhelming very quickly, so take advantage of using instances and to organise your assets in layers.



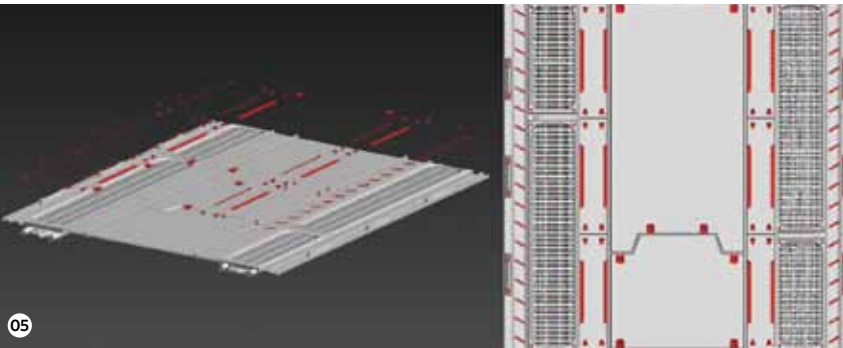
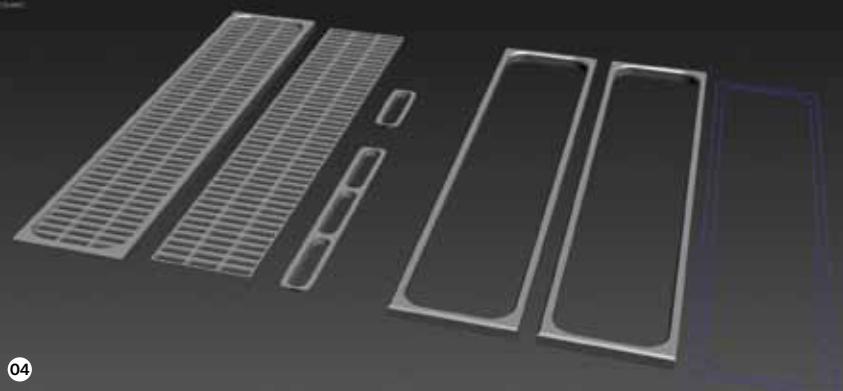
04 Model the grate, pipes and cables The easiest and fastest way to create a grate is to use the extended splines in 3ds Max. Here, we'll be using WRectangle, which provides control over both the outer and the inner radius. Throw a Bevel modifier on top of this and then chamfer the edges for better definition. For the holes, start with a cylinder, delete the top and bottom, extrude the upper edges, add edge control and then duplicate it. Pipes and cables are just simple cylinders with some details.

05 Add floating geometry for details In this step we're going to add a bunch of little details to the floor. My preferred method is to do so by adding floating geometry on top of the floor that's already been created. Enabling these details to float makes is very easy to try a variety of looks, and to add or remove details without ever having to commit to one look (so long as it looks good from a top-down view). It's a non-destructible workflow and if you're working on a whole environment you can easily use those same details in other textures to obtain a much more cohesive look to the scene.

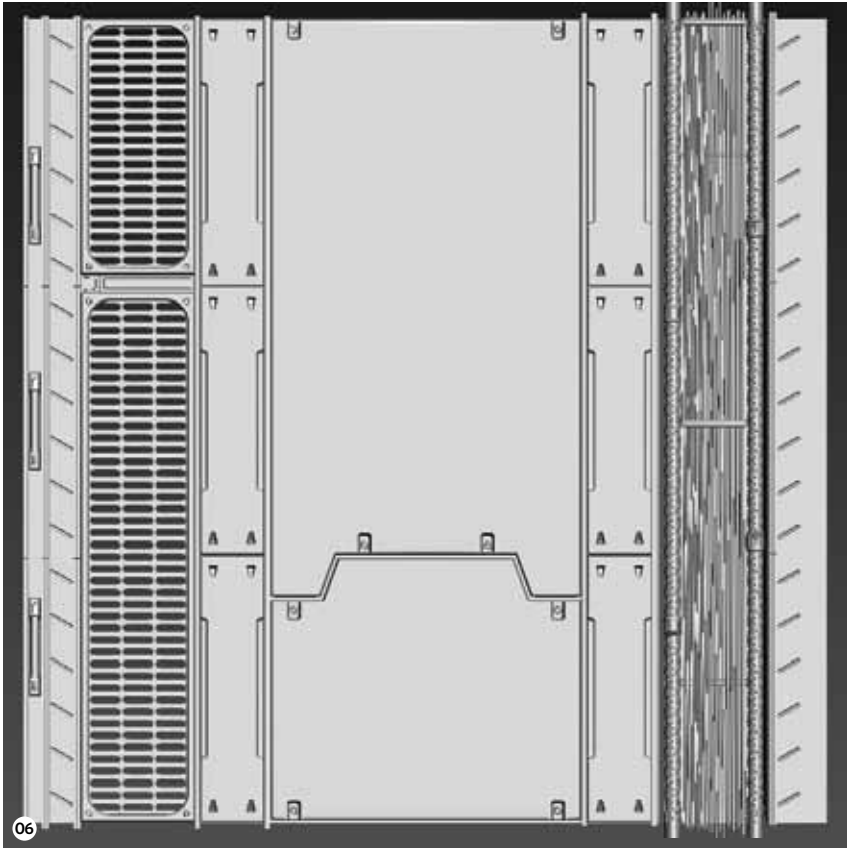


02 Tile This is an important part of the process, as we need to make sure that the model is lining up correctly. It's absolutely crucial to avoid seams in our bakes. So, using the block out model that we made, we can test out our tiling by duplicating the mesh. Try using the Array tool in 3ds Max – it's very precise and enables you to change the settings in real time (so long as you remember to hit Preview).

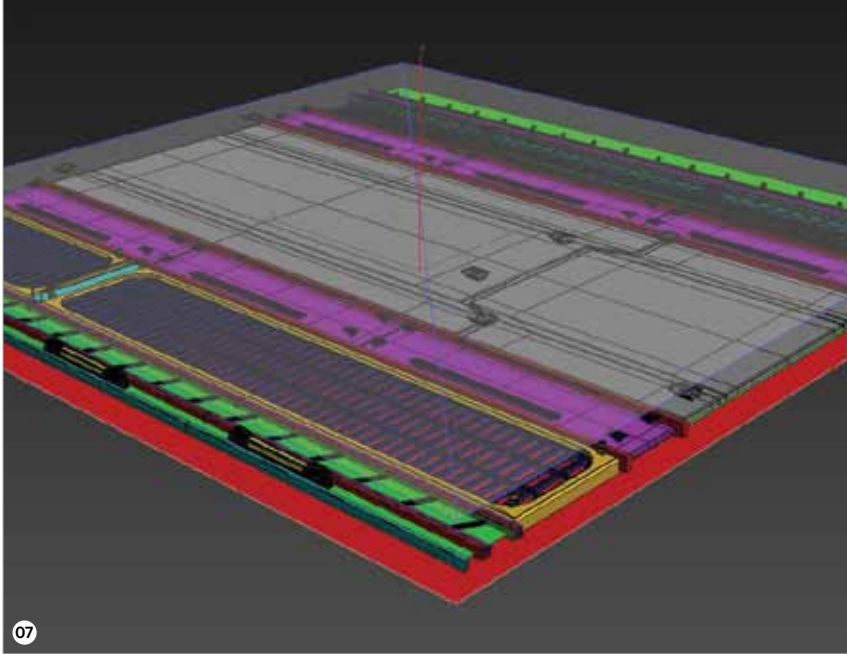
03 Model the high-poly panels and lights This part of the process is all simple box modelling. It may be easier to take a piece of your block-out geometry, redefine the shape so it looks the way you want it to, reset the Xform on it, then add an Edit Poly modifier on top. Rename it Edge Support and add edge support wherever necessary. Swift Loop is your best friend in this step because it will make the process go faster. Apply a TurboSmooth modifier on top and voila. You can always go back and tweak the low-poly mesh and it shouldn't break your model as long as it's not a huge change. Alternatively, you can just delete your Edge Support modifier and start over.



Floating geometry pro tip
Make sure that the Normals on the borders of the floating geometry are all on the same smoothing as the Normals on the mesh underneath it, and that the face or polys are all at the same angle so that when it's baked, it looks like one mesh. If not, you will see a seam on your Normal map, which will interrupt the consistency of the tiles.



06 Set up the floor for baking Since we want the grate to show what is underneath it without looking flat, we are going to have the grate on one side of the texture, while the other side will show the cables and wires that run underneath it. This way, we will have to map it accordingly when doing the low-poly mesh of the floor. Doing it like this means we are also optimising the texture space.



07 Project on a simple plane An important step before we do the projection is to apply different colours to each part on the high-poly, such as screws, panels, cables and so on. Making a projection plane of 2m by 2m will match the size of the grid we started with. Apply a Projection modifier to the plane, pick all of the objects that make up the high-poly floor and make sure the cage covers everything, including the floating geometry.

Artist Showcase

Mouhsine Adnani
I'm a senior 3D environment artist who has been working in the game industry for over five years. I've worked on titles such as *Star Wars: The Old Republic* and *Warframe*. I love the limitless freedom that creating 3D art offers.



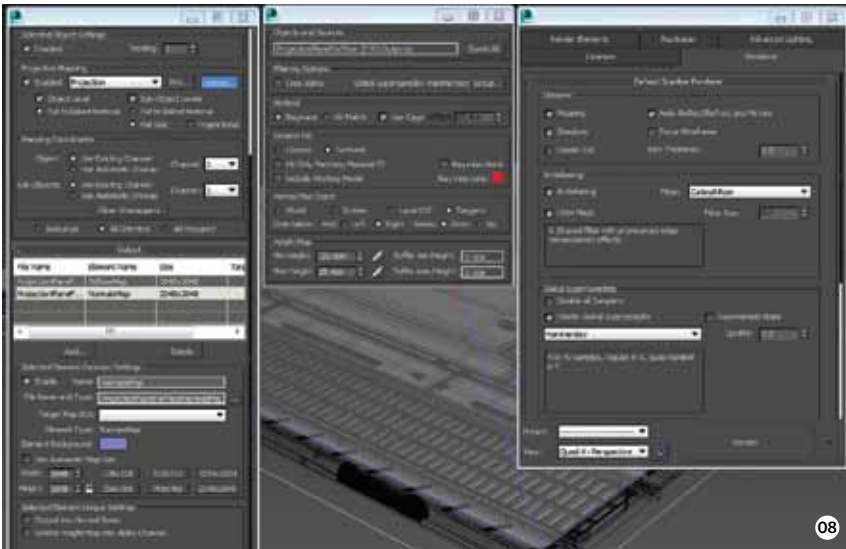
Moroccan Door 3ds Max, ZBrush, Marmoset, Photoshop (2013)
I've always been fascinated by the complexity of Islamic art, and I thought I'd give it a try.



Medieval Door 3ds Max, ZBrush, Marmoset, Photoshop (2013)
I made this door to improve my ZBrush skills. I looked at different references of medieval doors and made my own.



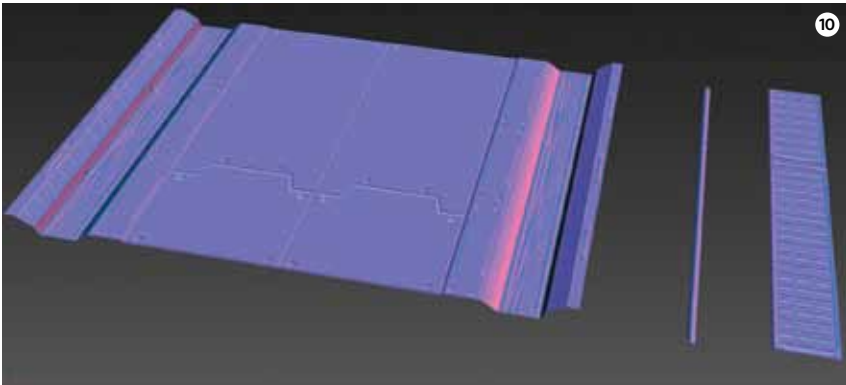
Shipping Container 3ds Max, ZBrush, Marmoset, Photoshop (2013)
The shipping container was made as part of an exercise on hard-surface modelling and also to try out dDo.



08 Render to texture Using Render To Texture (press O), make sure that Projection Mapping is enabled. Under Options, make sure the Global Supersampler's filter is on Catmull-Rom and Supersampler is on Hammersley and set the quality to 1.0. Head back to output in the RTT window, add a Normal map and Diffuse map and make sure they are both enabled. We should also give them a target folder and name where they will be saved. For this example I've set the size to 2048 by 2048, but you can go higher if you want. Save as TGA 32-bit. Hit Render and let it do its magic.



09 Use nDo2 for Ambient Occlusion and Spec Working with nDo2 is pretty straightforward. First of all, open the Normal map that we created in 3ds Max in Photoshop, then open nDo2 and click on Convert and pick AO and Specular. Make sure that the Tileable box is checked. Now click on Active Doc and let nDo2 run the process. You can tweak the settings of your map further by using the Options that pop up with each map.



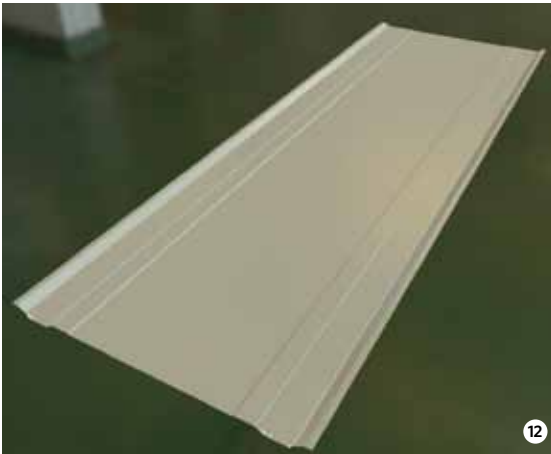
10 Make the low-poly floor Apply the Normal map we made to a simple plane in 3ds Max and add some edges where the textures have natural trims to define the floor a bit. Map the cables and wires to the other side of the floor as well, since we only made one of them. Detach the polygon where the grate is, give it edges on the sides and then duplicate it. You can then move it to the other side of the floor. Make the floor wider by duplicating the big middle panels, then map the thick cables on half of a tube to give them more shape.



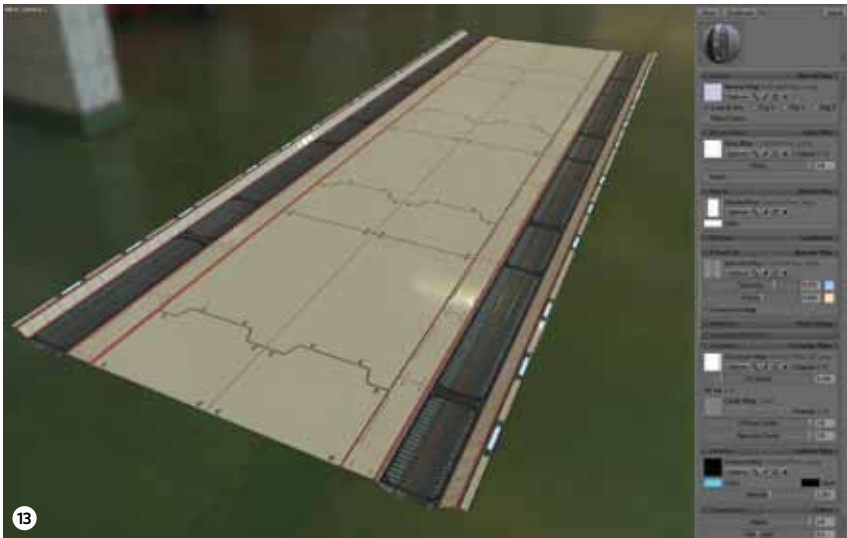
11 Texture in Photoshop Now that we have all the maps, let's put them all together in Photoshop. Put the AO map on Multiply (20% or less) and use the mask to make your selections. Apply colours to the panels, screws and all the other parts of the floor. This might take a little time to find a good balance of colours – for this, I recommend testing the texture in 3ds Max to see how it's tiling and that nothing feels too obvious when it repeats. You can also add subtle edge scratches on the panels and grate where people would be walking on it.

Model for Normal maps

When working on your high-poly model, keep in mind this is being created to mainly extract a Normal map. Exaggerate the shapes a bit so they can read better when they are baked, and try not to have any 90-degree angles on your extrusions. You should slope them because when you project on it, you will get a flat-looking Normal map.



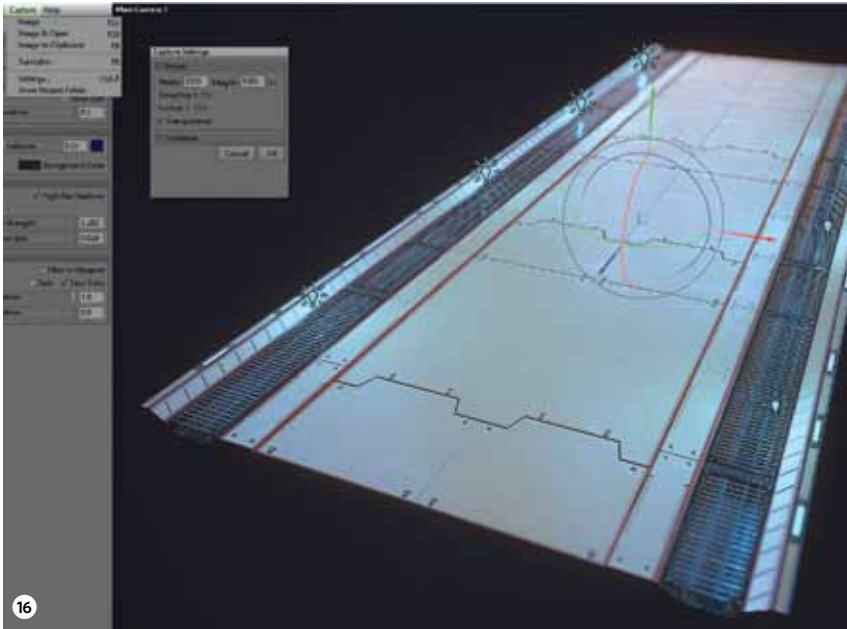
12 Import meshes Marmoset Toolbag 2.0 is a powerful program that will definitely make your art shine. First, we are going to import our floor mesh from 3ds Max. Use the Add Mesh control (Cmd/Ctrl+B) to import the floor. Marmoset reads OBJ, FBX and other file formats, so you should be able to import your work. The model should now pop in the viewer, and you will also see it under the Scene tab. You can select it from here and explore more options for it.



13 Create a material Making a material in Marmoset is very intuitive. Albedo is used now instead of Diffuse because it is a more accurate term when working with PBR. Plug in all the maps in their corresponding slots. Your Albedo map should mainly contain colour information and there is a slot for AO that will give you control over your AO map in Marmoset, but don't forget to add your Emissive map. For your Alpha to work, under Transparency select Cutout. That should do the trick.

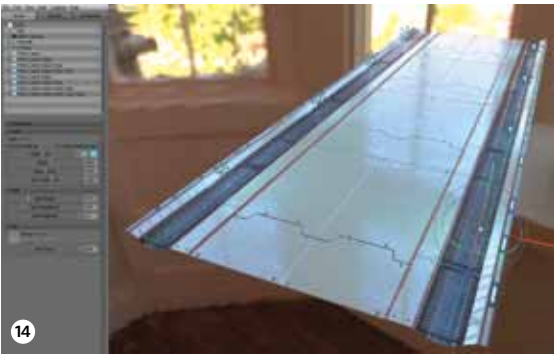
Spec, Gloss and Emissive maps

To take advantage of the physically-based rendering (PBR) in Marmoset, spend some time tweaking your Spec and Gloss maps. The end result will definitely be worth it. If you have created edge scratches and other details, make sure you add them to include them appropriately in your scene. Your Emissive map should be black and white – its colour can be changed on the fly in Marmoset.

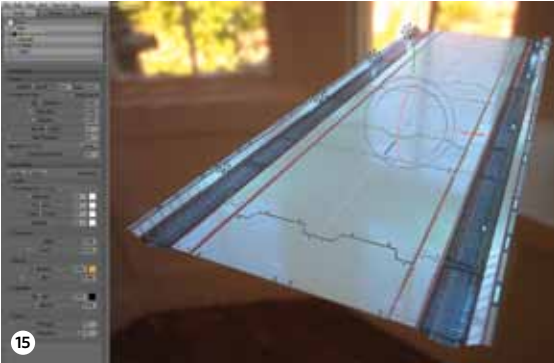


16 Render Under the Render tab, disable the Sky background and pick a desaturated blue background. Enable Local Reflections, Ambient Occlusion and High-res Shadows. If you notice that Marmoset is getting less responsive then, under Viewport, bring down the resolution to Half and the Anti-aliasing to None. Now we are ready to render, but before this, go to Edit and under Preferences pick an output for your image. Go to Capture>Settings (or press Cmd/Ctrl+P) and pick a Size for your image. Crank the Sampling to 25x and enable Transparency if you want an Alpha for your final image. Press OK then hit F10!

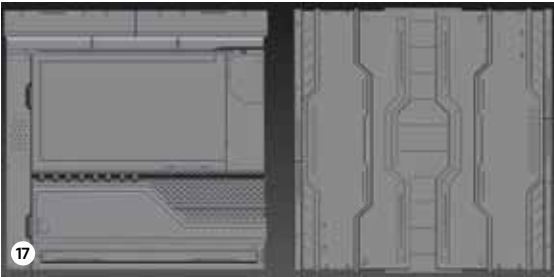
• **DID YOU KNOW?** • All tutorial files can also be downloaded from: www.3dartistonline.com/files



14 Sky and lights Under the Scene tab, click on the Sky and this will give you the option to pick different presets. For this scene, opt for Museum because it works well with the shader we've set up. Go to Add>Point Light or press Cmd/Ctrl+L and name it Floor Lamp. Move it and place it by one of the emissive floor lamps (one light per three floor lamps). Give it a blue tint, check on Cast Shadow and tweak its value until you get something that looks good. Pressing Cmd/Ctrl+D while the light is selected will duplicate it so that it can be spread around.



15 Post and Camera Effect Post and Camera Effect are two settings under the Main Camera in the Scene tab. Enable Depth Of Field and tweak the Focus Distance with the near and far blur to give your scene some depth. In the Post Effect, give it a bit more Saturation, crank up the Sharpness, and add some Bloom and a subtle vignette effect. Drag the Grain all the way to 0. Press the space bar to go full screen and to gain a better view of all the effects you've applied.



17 Potential of this workflow Using this process, I went ahead and made the wall and ceiling of a small environment. I also made a Decal map to add signs and logos to break up the textures a bit. Notice that you can make different assets with these textures – for example, you can remove one of the grates, detach some of the panels and so on. Try to tell a story with your environment and your scene will come together easier than you think.