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Ashish Parashar
bit.ly/2hhvLBN

Software 3ds Max, ZBrush, Substance Painter, Photoshop

40 pro secrets for 3ds Max

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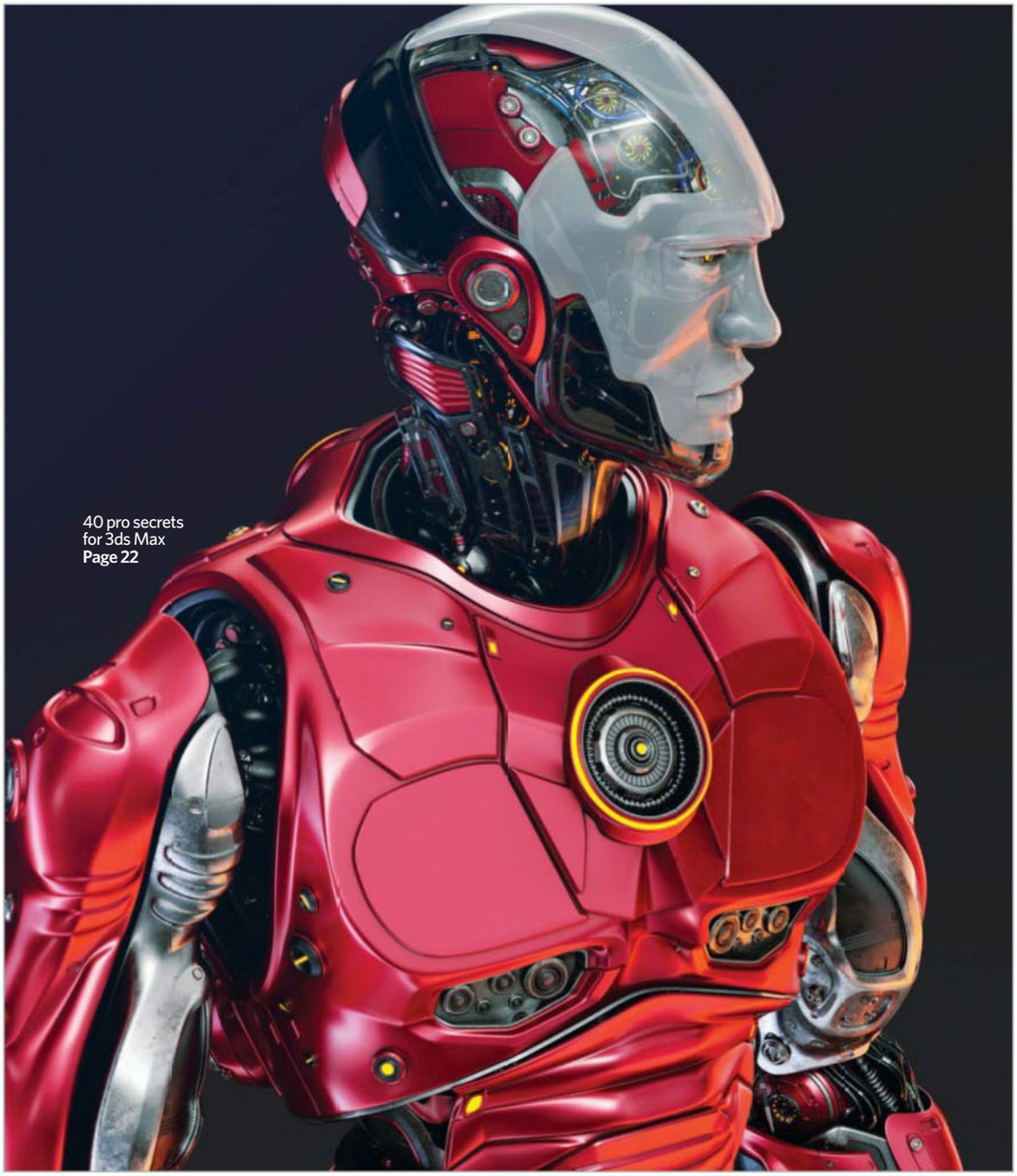

40 pro secrets
for 3ds Max
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Welcome

Variety is of the utmost importance when it comes to our industry. It's very true that the shots you're working on, the characters you're sculpting or the game environments that you're building will change day to day, which leads me to believe that an understanding of several different themes and disciplines is essential if you want to succeed in computer graphics – whether you put that knowledge to work professionally or not.

That's where we come in – we've got an exceptional offering on show this month, courtesy of a smorgasbord of seasoned and exciting 3D artists. For starters, we've delved into the pro secrets that'll help you get ahead in 3ds Max, and later on you'll find a world of amazing tutorial content covering Blender, Maya, ZBrush and much more. We've also compiled the ultimate texturing workshop, and in addition, we've been behind the scenes at the fascinating Luma Pictures to find out all about the culture and passion that permeates everything the team there does.

It's been a good year – we've worked with some of the most talented people in the industry and delivered a 100th issue that I, for one, am extremely proud of. Thanks for spending time with us in 2016 – have a great holiday season and we'll see you next year.

Steve Holmes, Editor

Sign up, share your art and chat to other artists at **www.3dartistonline.com**

Get in touch... 3dartist@imagine-publishing.co.uk @3DArtist Facebook.com/3DArtistMagazine

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FUSION 8

The world's most advanced visual effects and motion graphics software is now available on Linux as well as Mac and Windows!

For over 25 years Fusion has been used to create visual effects on thousands of blockbuster films, TV shows and commercials. Fusion features an easy to use and powerful node based interface, a massive tool set, true 3D workspace and GPU accelerated performance all in a single application! Now with support for Linux, Fusion 8.2 is easier than ever to integrate into your existing VFX pipeline!

Hollywood's Secret Weapon

Fusion has been used to create groundbreaking visual effects and motion graphics for Hollywood films such as The Martian, Thor and The Hunger Games, as well as on hit television shows like Orphan Black, Breaking Bad, Grimm and Battlestar Galactica! If you've ever gone to the movies or watched television, then you've seen Fusion in action!

Work Faster with Nodes

Fusion uses nodes to represent effects and filters that can be connected together to easily build up larger and more sophisticated visual effects! Nodes are organized like a flow chart so you can easily visualize complex scenes. Clicking on a node lets you quickly make adjustments, without having to hunt through layers on a timeline!

Incredible Creative Tools

Whether you need to pull a key, track objects, retouch images, animate titles, or create amazing 3D particle effects, Fusion has the creative tools you need! You get a true 3D workspace, the ability to import 3D models and scenes from software like Maya and 3ds Max, along with hundreds of tools for compositing, paint, animation and more!

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Fusion's GPU acceleration gives instant feedback while you work, so you spend more time being creative and less time waiting! Fusion 8 Studio also includes optical flow and stereoscopic 3D tools, along with unlimited free network rendering and tools to manage multi user workflows, track assets, assign tasks, review and approve shots, and more!

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The Expert Panel

This issue's team of pro artists...

ASHISH PARASHAR
bit.ly/2hhvLBN

Ashish based his phenomenal cover image on a concept by the amazing Ben Erdt and brought it to life in 3D. Find out how he, and others, get the best out of 3ds Max on p22.
3DArtist username n/a

TYLER SMITH
www.artstation.com/artist/tsmith3d

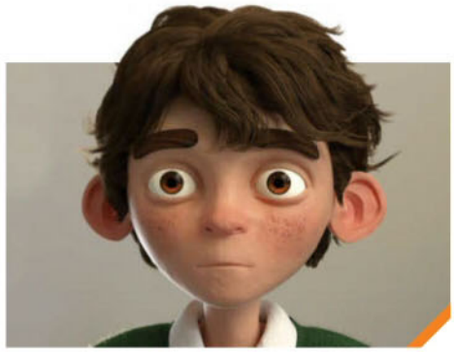
Creature enthusiast Tyler has garnered himself a little bit of a following on ArtStation recently, and it's easy to see why. Learn to create your best ever creature renders on p44.
3DArtist username tsmith3d

JOEL ZAKRISSON
www.joelzakrisson.com

Dioramas can be so interesting, especially when they're optimised for real-time rendering and you can see the whole thing from many angles. Discover Joel's awesome approach on p52.
3DArtist username JoelZakrisson

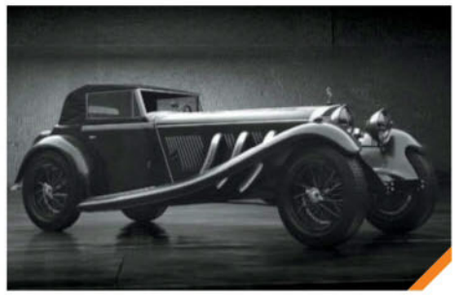
TONY CAMEHL
www.artstation.com/artist/tony_eight

Many will argue that anatomical study is absolutely imperative if you want to be a top character modeller or animator. There's a lot out there on humans, but what about animals? Check out p58.
3DArtist username tony_eight



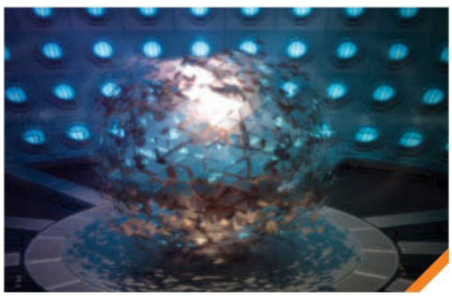
MICHAEL CAUCHI
www.mikecauchiart.com

Naturally, hair and fur work can be very difficult to get right and a lot of artists will avoid it where possible. If you're one of these artists, give Mike's guide a go – it's on p66 and is nice and easy to follow.
3DArtist username mikecauchi



PAWEŁ BRZUSTOWSKI
www.artstation.com/artist/pawelbrzu

Paweł's vehicle renders are really striking, and key to this is both the black-and-white noir style he achieves and the lighting setup he employs to enhance the effect. Check out his Blender tips on p72.
3DArtist username pawelbrzu



RAINER DUDA
www.rd-innovations.de

Clarisse is one of those tools that, despite being more than capable in a full-on production environment (see ILM), doesn't get a lot of love in other areas. Rainer aims to put a stop to this on p76.
3DArtist username Rainerd

MAARTEN VERHOEVEN
www.artstation.com/artist/mutte

Pixologic surprised a lot of people when it announced its cut-down, slim version of ZBrush, ZBrushCore. Sculpting pro Maarten takes the new product for a test drive over on p84.
3DArtist username mutte

IAN FAILES
vfxblog.com

Seasoned VFX writer Ian has had a chat with the lovely team at Luma Pictures this month to talk about what makes the team special, and what life is like as a Marvel-approved vendor.
3DArtist username n/a

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"Edit Poly modifiers let an artist go down the stack and make changes"

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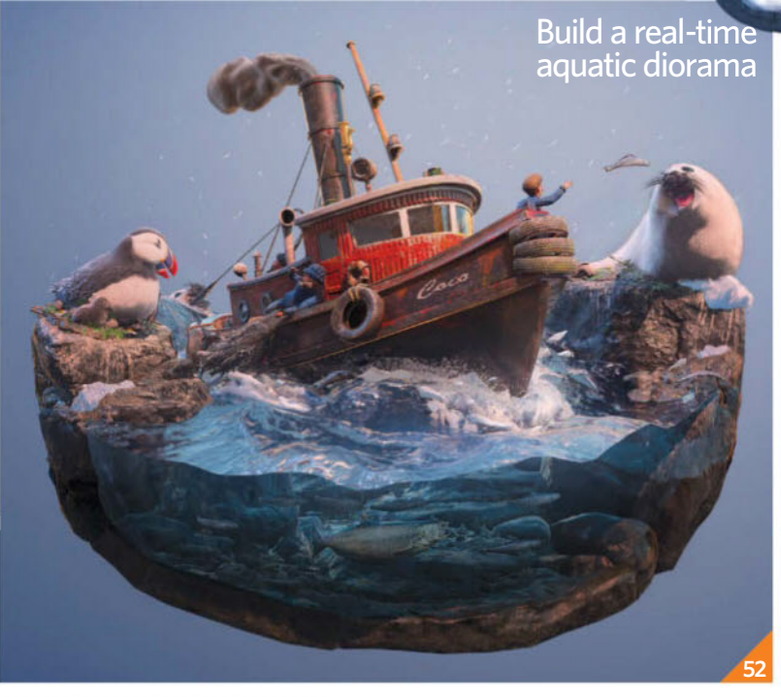

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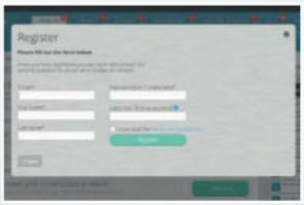

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The Gallery

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"I had this CAD model for the Porsche RS, and I thought about doing something classic this time. I used V-Ray Carpaint for the car shader, and an HDRI with a V-Ray dome light. I was searching for some kind of European house for the background, and I was happy with this composition. Then, I did the compositing in Photoshop"

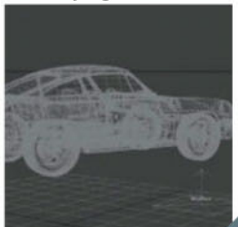
Mohamed Raof Sayed,
911 Carrera RS, 2016

Mohamed Raof Sayed
www.mohamedraof.com

Mohamed is a 3D artist living in Dubai. He works on arch-vis scenes and enjoys vehicle vis

Software 3ds Max, V-Ray, Photoshop

Work in progress...



Adam Fisher
www.afisher.com.au

Adam is a freelance character artist working in the videogames industry

Software Maya, ZBrush, MARI, Substance Painter

Work in progress...

"I've had the idea for this character in my mind for a while and I finally had some time to create her. I always like to use my personal projects to learn new tools and techniques and for this project I wanted to test out using XGen for hair and improve my workflow for texturing skin"

Adam Fisher,
Priestess, 2016

Mariusz Becker
mariuszbecker.com

I'm a multidisciplinary designer from Cologne in Germany

Software Cinema 4D, 3D Coat, NDO, Maxwell Render

Work in progress...

"A friend of mine and fellow artist, Vitaliy Havrylyuk, challenged me to create an environment based on a photo he took, so I built this room and added some elements to it. It was quite fun to make as this was the first time that I actually used 3D Coat"

Mariusz Becker,
05/01/16, 2016

Vincent Dromart & Jean M Oliveira
www.vinz.artstation.com
www.jeanmarcel.co

Vincent is a character look-dev and texture artist and Jean is a 3D modeller

Software ZBrush, Maya, Arnold, Yeti, MARI

Work in progress...

"I created this image for my personal work. It was a way to find new challenges and improve my skills and workflow and also because I love working on stylised and appealing characters. Jean focused much more on shape language, major forms and a little less in super-fine details. He wanted to explore simplicity and cleanness of forms. Concept art is by Carlos Luzzi"

Vincent Dromart / Jean M Oliveira, *Native American*, 2016

“This picture is the portrait of a relative. It’s part of a larger series of images made in order to develop a personal visual style”

Jean-Michel Bihorel,
Seyyal, 2016

Jean-Michel Bihorel
jmbihorel.myportfolio.com

Jean-Michel is a digital artist living in Paris. He creates works for movies and commercials

Software RealityCapture, ZBrush, Maya, Redshift

Work in progress...

> I always find abandoned scenes really interesting because they have a story to tell and a lot of objects and details to look at. I started this scene to simply visualise a photograph and improve my Unreal Engine skills, but as usual when I work on small projects, it turned into something much bigger along the way
>
> **Amir Abdollahi,** *Abandoned Kitchen,* 2016

Amir Abdollahi
amirabd2130.blogspot.com

Amir used to work in games, but he's now a programmer and does 3D as a hobby

Software 3ds Max, Photoshop, UVLayout, Unreal Engine 4

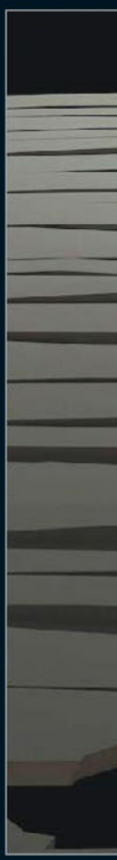
Work in progress...

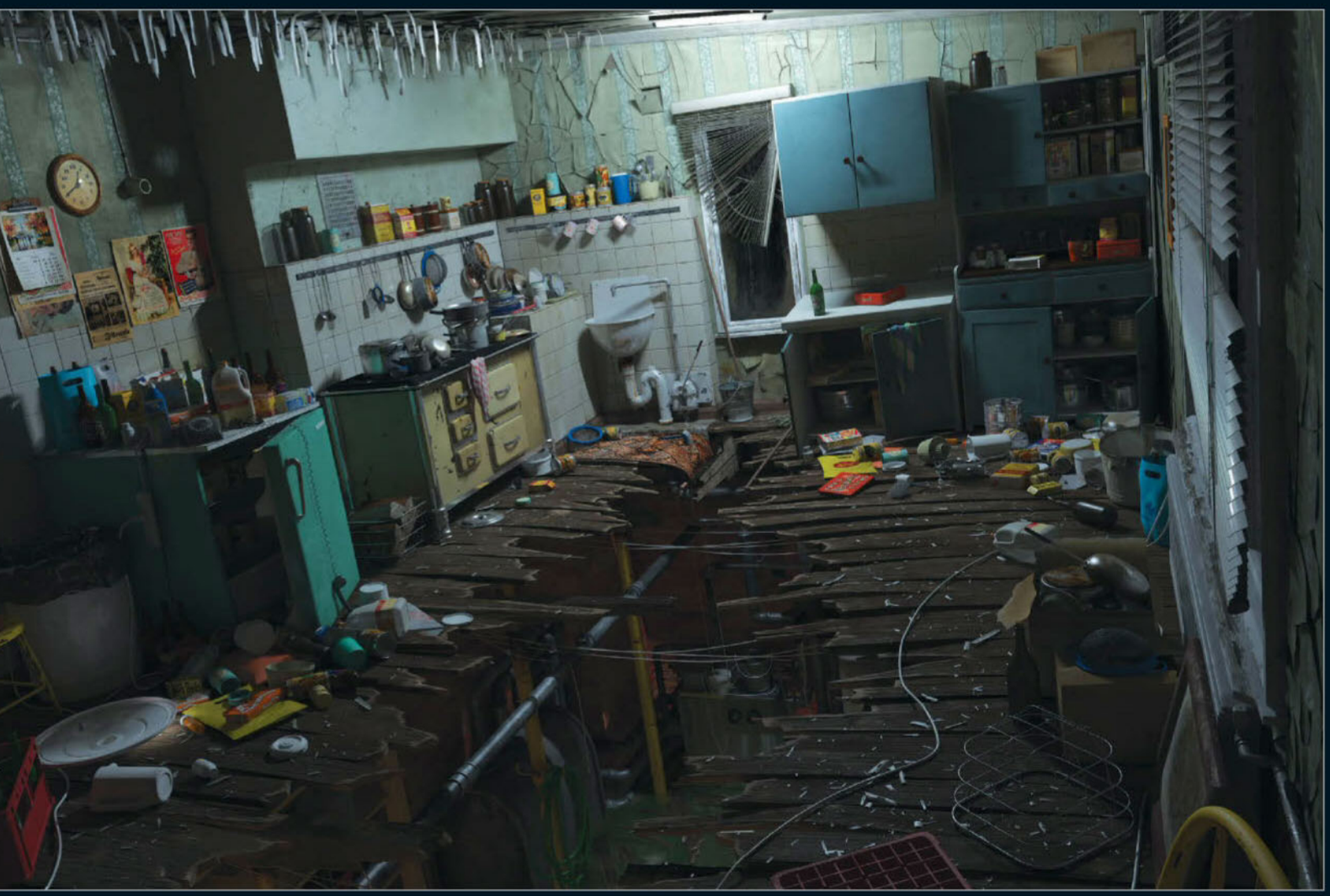
“I used to work with UDK and absolutely loved it. I was really hyped when the new Unreal Engine 4 came out. I've been planning to do a scene using UE4 for a long time – to check all the new features, especially the PBR workflow. I was initially going to render this scene in V-Ray, but I saw the opportunity to move it to UE4 and I'm glad that I did. I really loved the experience using UE4”

Amir Abdollahi,
Abandoned Kitchen, 2016

TEXTURING THE CEILING
BELOW Making weathered environments and especially peeled paint is always hard to get right. I used Edit Poly, Paint Deform and Photoshop to achieve the effect.

MODELLING THE WALLS
RIGHT The initial models were done using Splines in 3ds Max, extruded and turned to Editable Poly, and then I used Paint Deformation in Editable Poly to deform some parts and also add some bumps.





ADDING DETAILS
ABOVE Adding more objects to the scene is really time consuming because you usually need to see a lot of references and make a lot of changes to the scene, but it's satisfying at the end.

DESTRUCTION
LEFT Doing something different to your reference image is always tricky – but fun at the same time. Destroying the ground was one those parts in this project. I used Edit Poly and Bend to do so.

Alien bust by Ashish Parashar. Concept by Ben Erdt

40 PRO SECRETS FOR 3DS MAX

Discover advanced modelling tips, quick UV techniques and top plugins for your workflow

With over 25 years of history, 3ds Max is one of the longest running tools for 3D artists around the world today. There are ample areas in the program to cut your teeth on if you are a beginner, from modelling to animating and lighting, but even more that you could learn if you are a more advanced user, like rigging and dynamics.

Some artists will use 3ds Max to model hard surfaces, accumulating parts from years of work into a library for quick model assembly. Concept designer Mario Stabile places them over the model using the tool Select and Place and explains why the process is fundamental for storytelling. "Sometimes, adding some small extra details that tells the story of your creation can increase its value a lot."

The program doesn't just stop there, though. You can enhance your renders with a whole host of plugins, from the common like V-Ray for lighting and rendering to scripts for cleaning verts and creating hair. Our list of outstanding artists tell us which of these are their favourite and provide top tips for maximising your models today!

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Senior artist, Epic Games

TIPS AND TRICKS

01 START SIMPLE

In most cases, I start modelling with a simple primitive object like a box, cylinder, sphere or plane and after, I convert them into Edit Poly and start to play with their forms. I like this method because it lets you control every point, edge or polygon on your object.

Bondok Max

02 USE A KIT LIBRARY

If you are a concept designer and you need to do quick sketches, you need a library of your own kits. With every new work you gain new shapes, details which you can save for future projects as kits. In the next project, detail and change them. They are not only time-savers, but they also build your own style – it is your work, your signature in the 3D world.

Vladislav Ociacia

03 CREATE A LIBRARY

Try to use only your kits, not others, because only in such way you can be unique and train your style. For example, with my artwork I can demonstrate the successful use of my kits. My brain was made in four hours, pilot with brain – one day, prototypes head – two days, shi – one and a half days (thanks to my kits). If you are a 3D concept designer, put your soul in your work and never, ever download kits of other successful artists illegally!

Vladislav Ociacia

04 CHECK DOCUMENTATION!

Autodesk has really good documentation online. So, instead of struggling with learning a tool for a long time, try looking it up on 3ds Max's site. I've learned how to do cloth simulation, rigging and using 3ds Max's Particle system relying only on the Help files.

Victor Hugo Queiroz

05 EMBRACE GRAPHITE TOOLS

One of the best implemetations that I've seen over the last ten years is the Graphite tools. These tools are the biggest game changer for modelling. You can do solid retopology and there are several great modelling tools.

Victor Hugo Queiroz

06 CREATE TOPOLOGY PATTERNS

The Generate Topology menu in the Ribbon's Polygon Modeling section is an excellent way to get some quick patterns on your models. I use it a lot for tech patterns, or nice threading/knurling on tubes and such.

Mark Van Haitsma

07 MODEL WITH EDGE MODE

Use Edge Mode with editable polys to constrain vertex movement to edges. By selecting a group of vertices and moving them back and forth together, you can smooth out surfaces neatly for a refined finish.

Mike Hill

08 ISOLATE MESH

Isolate is the lightning bolt icon in the bottom of the 3ds Max UI right under the animation track. It is a great way to quickly work on a particular mesh without having the rest of a scene's meshes active.

Tudor Fat

09 SWIFT UVS

The Flatten By Smoothing Group option in the Explode menu is a great way to initially break up UV islands by smoothing groups. Followed by a Quick Peal and Relax, this makes UVing an incredibly fast process.

Mark Van Haitsma

10 USE THE DOUBLE TURBOSMOOTH METHOD

A good way to get a quick high-poly model with some nice, round edges without chamfering everything out is to add a TurboSmooth with Smoothing Groups option checked with two to three iterations, followed by a regular TurboSmooth on top of that. You don't get absolute control of your edges, but it's a quick and dirty way to get a decent result without spending too much time on the high poly. Smoothing Groups must be set up perfectly for this to work.

Mark Van Haitsma

11 SMOOTH GROUPS FOR CONCEPTS

If you are making concept models that show the intention of the design, then you should avoid TurboSmooth – the needs of the topology will slow you down. Learn to keep geometry simple and strategically use Smooth Groups.

Mike Hill

12 EDITABLE MESH VS EDITABLE POLY

Editable Poly is optimised for advanced modelling and creates fewer errors than an editable mesh, plus it has many more settings than an editable mesh. It also provides a flexible and workable mesh. You can easily convert any object to an Editable Poly mesh without getting errors or other problems.

Tudor Fat

MODEL HARD SURFACES

Create a character with 3ds Max and learn how to use the Edit Poly modifier to add detail

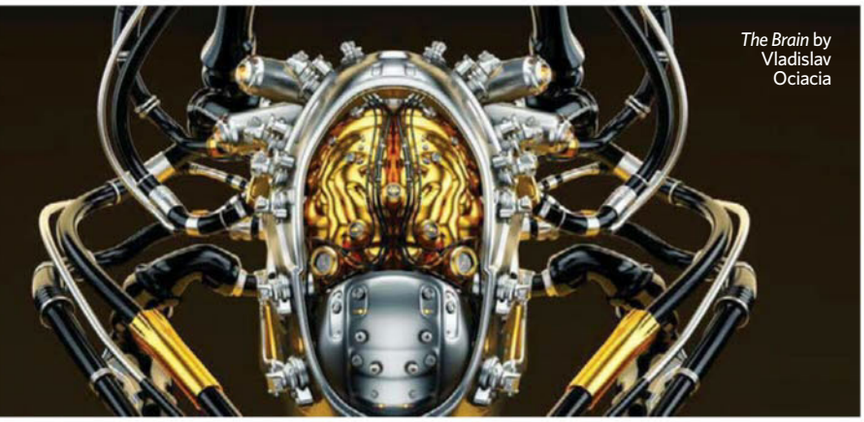
01 Block the idea At this stage the objective is to get the overall shape and feeling for the design and to add some small details for yourself to guide the design in the direction you want. This part of the process has to be quick to show and check with your supervisor if it is going in the right direction. I usually do this in ZBrush.

02 Model hard-surface pieces Now we can start creating clean shapes and adding new pieces. Start working on the parts that will affect the cloth simulation. Use 3ds Max for this part, which involves stacking modifiers. First, start creating the basic shape of the piece, giving it the desired look in a basic way. Next, add details in a new Edit Poly. Once happy, apply a Chamfer in a new Edit Poly to smooth the edges or make them sharp. Apply two Symmetry modifiers to finish.

03 Model tubes, wires and connectors For this kind of part I usually start with splines, as it's easier to tweak. Next, create a simple Line Spline for the yellow tube and three Spiral Splines that will be the shell for this tube. Give different parameters to each Spiral. After that, attach all of the Spirals together and apply a Path Deform modifier. You'll see the metallic wire follows the shape of the yellow tube. This way we can place the spline where we want and the wire will follow.

Street Race Hot Rod II by Jomar Machado

Breakfast Time by Bondok Max



The Brain by Vladislav Ociacia

Suchomimus by Damir G Martin

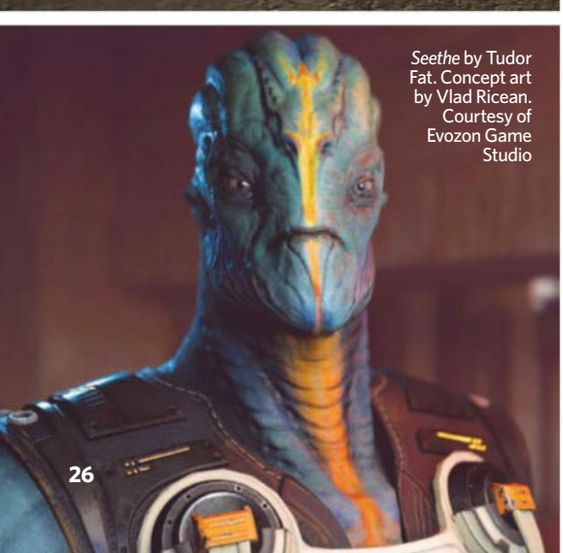
Skull Cyborg | Type 4.2 // AxTECH by Mario Stabile

04 Sculpt After that, we only need to finish sculpting the non hard-surface parts, and then it will be ready for rendering. My priority for the sculpt at this stage is to give personality and story background to the design rather than doing fine detail and clean shapes.

05 Create materials and render Once happy with the shapes and basic colour palette, bring the model into KeyShot and do some custom materials like this. This is important because it can change the results. Try to spend some time on this each time and you will have a nice material library in the future. After a few tests with different materials, choose an HDRI or create a light set. Set the camera properties and tweak the materials for better visualisation.

06 Post-process After getting the KeyShot render ready, be sure to do tweaks in Photoshop that would be take longer to do in 3D. Also, be sure to add some value and composition modifications. That would complete the process I use to make each design. I try to keep in mind that it is a concept for a design, so I don't have to get stuck on any part of the process, but the most important thing is to represent the idea as well as possible.

Dieselpunk Officer by Tudor Fat. Concept art by Vlad Ricean. Courtesy of Evozon Game Studio



Seethe by Tudor Fat. Concept art by Vlad Ricean. Courtesy of Evozon Game Studio

The Prisoner by Mark Van Haitsma

13 ADDING MULTIPLE EDIT POLY MODIFIERS

Whenever I am working on a model in 3ds Max, especially if it's a technically challenging model or something with mechanical details, I make sure to add an Edit Poly modifier on the top of the stack every time I make a big change or add a big detail that I might have to remove later or edit a bit. So, Edit Poly modifiers let an artist go down the stack and make changes without affecting the whole model. It is very helpful if the model has many details, such as lines, extrudes and so on, and your boss or client asks you to change something. With this method, the base geometry will always be safe.

Ashish Parashar

14 STAY WITH STACKS

It's better not to collapse modifications on your mesh until you are sure that this is the most accurate version. After that I recommended copying a mesh and then collapsing it but keeping the original asset hidden in your scene. It works perfectly with commercial work, even with tons of feedback – trust me!

Peter Nowacki

15 SKINNING

3ds Max is second to none when it comes to skinning and posing magnificent extinct animals. Personally, and on most occasions, I use the most basic version of the skinning method since I'm mostly creating stills and I'm not a character TD – I'm more of a generalist type. Any inconsistencies with my basic approach can be tweaked in post or within 3ds Max by stacking different modifiers on top of the problematic areas.

Damir G Martin

16 FREEFORM TOOLS

When creating 3D models with multiple elements consisting of hard surfaces and organic surfaces, it is difficult to modify them individually and maintain consistency at the same time. The Freeform tools provide the needed flexibility to make fast and easy adjustments and modifications to all the required elements simultaneously.

Tudor Fat

17 UTILISE THE FREEFORM SHIFT TOOL

When you are working on complex models with this tool, sometimes it's hard to not grab the unwanted vertices and move them. What I usually do is to select the verts in the area that I want to work on with the tool and hide the rest with Hide Unselected.

Tudor Fat

18 WORK WITH MODIFIERS

I never get tired of saying this over and over again: 3ds Max's most powerful tool is the Modifier palette. This palette enables you to work in a non-destructive way, and when you're dealing with a professional job it's really important for you to have some way of returning to some of your previous steps.

Victor Hugo Queiroz

19 USE FLOATING GEOMETRY

This tip is extremely helpful for beginner artists. Usually we have a tendency to model every tiny detail in the model itself. There are multiple problems with this workflow, though. A simple example would be, say we have to model a cylindrical sci-fi asset with many details, seams and bolts on the surface. Now, instead of cutting the geometry and modelling everything on the mesh itself, it's better to use separate meshes and place them over the model. This gives an illusion of a detailed mode. We use this workflow a lot while modelling hi-res geometry for the purpose of Normal map and AO map baking to be used on a game-quality mesh.

Ashish Parashar

20 SKIN WRAP MODIFIER

The Skin Wrap modifier is an excellent way to conform your meshes if the FFDs just aren't cutting it. Simply add it to any mesh, select a control mesh and you can go to town moving the verts around on the control mesh.

Mark Van Haitsma

21 CREATE FABRIC FUZZ

To create a fabric fuzz effect, I used the 3ds Max Hair and Fur modifier, and then I used a low-poly model for hair growing to save me time and make the hair cut easier.

Bondok Max

22 POLISH THE SHAPE

There are many different ways of getting a smooth and fine result for your mesh in 3ds Max. For hard surfaces I use these methods: support loops and TurboSmooth or the Quad Chamfer tool with high subdivisions, tweaking the Edge Chamfer amount and Edge Tension to get really cool results in no time.

Mario Stabile

23 MAKE USE OF SCRIPTS

Every time that you face a problem, remember: you're not the only one and someone has probably already figured out how to solve it. So, don't be afraid of relying on scripts. There's a great website called ScriptSpot (**www.scriptspot.com**) and you can find a lot of cool and useful scripts on there that will probably help you out with any bottlenecks.

Victor Hugo Queiroz

24 MENTAL RAY SKIN SHADERS

All of my dinosaur models are rendered in 3ds Max with the mental ray renderer. I like to use SS shader for skin and teeth. The skin shader can produce really nice subscatter effects through dinosaur teeth by passing a certain amount of light that comes from behind.

Damir G Martin

25 EXTEND TOOL

3ds Max has some pretty solid retopology tools in the Freeform Modeling menu. I use the Extend tool often to retopo more complicated sections of meshes, fast.

Mark Van Haitsma

26 SPLINES ARE COOL

You can get really cool results using multiple splines and shapes. Try combining them with the Path Deform modifier and you will get really interesting results.

Mario Stabile

27 USE THE HAIR FARM PLUGIN

For animal fur, I use Growth maps that I paint up on the model inside ZBrush. In a click of a button the map is exported back into 3ds Max to the designated Hair Farm parameter, where you can continue tweaking Hair Farm parameters to get the desired look. Since Hair Farm is fast and responsive, you can go through numerous variations in no time.

Damir G Martin

28 BUILD COMPLEX ELEMENTS IN SEPARATED SCENES

I'm always focused on building a complex mesh on separate scenes, which works faster than in just one complex scene and it is much easier to organise.

Peter Nowacki

29 LIGHT A SCENE

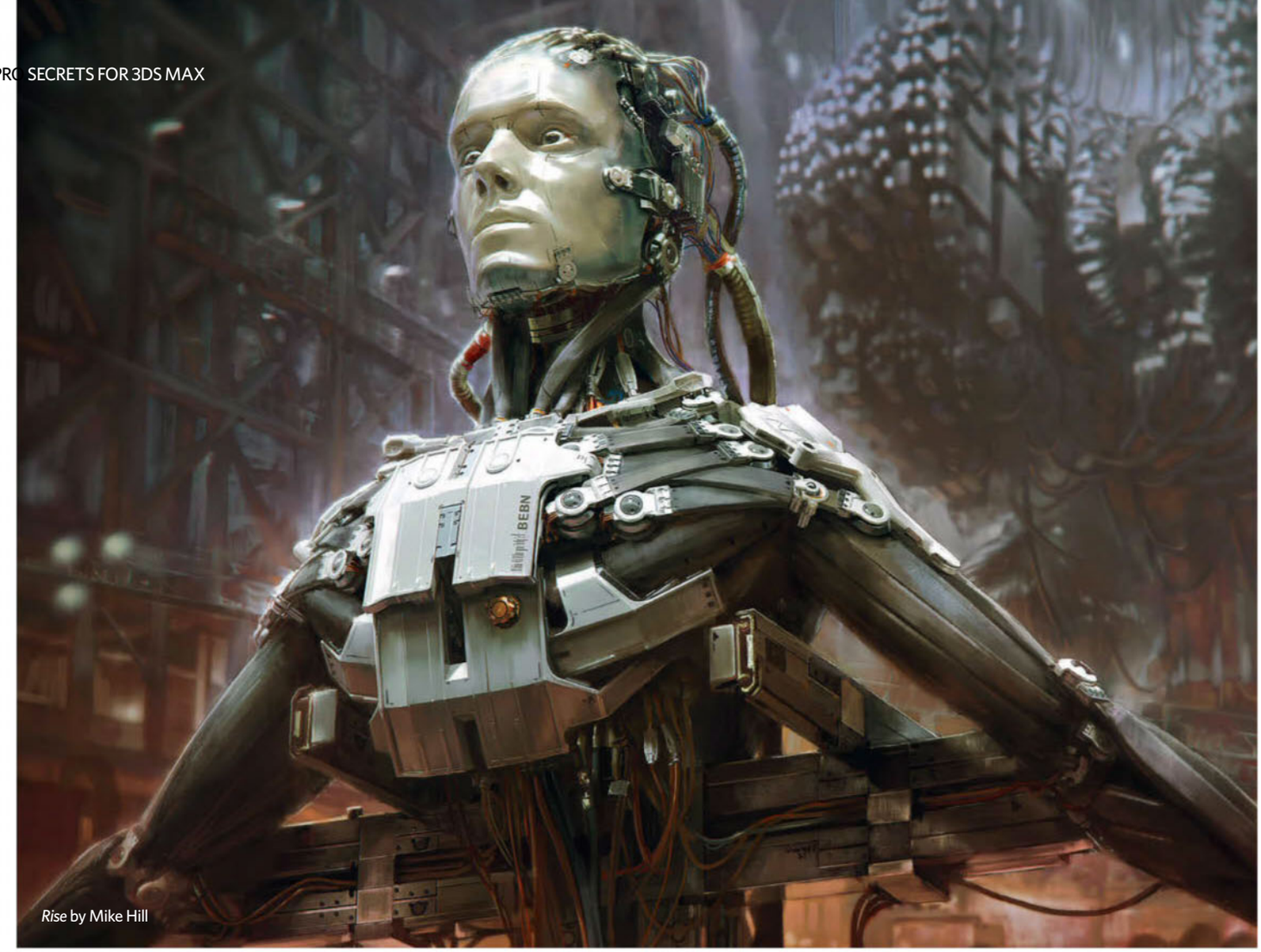
For the kind of imagery I produce, I use image-based lighting rendered with mental ray. Using IBL can render nice images in a fraction of the time it takes with area lights.

Jomar Machado

30 THE FINAL RENDER

I am a game dev artist, so most of my work revolves around real-time models and real-time rendering. But if I need to render inside 3ds Max my best bet is V-Ray. I use V-Ray lights and a basic three-point light system to light my scene. V-Ray does a great job rendering out images, which I take to Photoshop for little things like contrast and sharpening.

Ashish Parashar



Rise by Mike Hill

PLUGINS

31 ORNATRIX

This is one of the best hair solutions that I know. In my opinion it is currently the best hair solution for 3ds Max (and remember: use modifiers!)

Victor Hugo Queiroz

32 ONTOPREPLICA

This is not a Max-specific plugin, but comes in handy when working with reference images. It's a simple program that allows you to display windows on top of everything else and I use it to put reference images up. It comes in very handy when I want an image right next to what I'm modelling, without having to strain over to the next monitor. It works well for lining stuff, especially for designing sights on weapons, since you can mess with the Opacity settings as well.

Mark Van Haitsma

33 BONESPRO

We all know – or we've actively forgotten – just how painful skinning in 3ds Max can be. This plugin can save you lots of time and it won't test your patience!

Victor Hugo Queiroz

34 VERTEX CLEANER

I use the Vertex Cleaner script by Shiva3d quite a bit, since I tend to do a lot of Boolean operations. This script will clean up all the extra verts that are left after a Boolean operation. There is still some manual cleanup afterwards, but it cuts out a lot of time wasted getting rid of those verts.

Mark Van Haitsma

35 V-RAY

I'm familiar with a lot of render engines for 3ds Max, and for me the most reliable solution is V-Ray. Its flexibility, speed and integration with 3ds Max (and its plugins, whether third-party or not) make V-Ray into some kind of 'Swiss army knife' render engine.

Victor Hugo Queiroz

36 UVLAYOUT BRIDGE

As for using UVLayout as a UV mapping tool for 3D models, this plugin bridge is my personal favourite. It makes the transition between 3ds Max and UVLayout seamless and beautiful to work with.

Tudor Fat

37 POWER PREVIEW

This tool will harness the viewport to create quick screenshots on a large scale. It saves out files into image sequences – perfect for rendering preview animations.

Mike Hill

38 TEXTOOLS

I use this plugin to quickly render and adjust the UV tiles. One of the most powerful features of this tool is Shift Overlap, which moves the overlapping UV tiles on a separate quad UV frame. This helps get rid of problems when texturing in various tools.

Tudor Fat

39 HDR LIGHT STUDIO

HDR Light Studio lets us light and render the scene in a fraction of the time it takes in 3ds Max. I estimate it takes me a third of the time that it would without HDR Light Studio. I don't know how I'd live without it now. Without HDR Light Studio I would have to mess about placing and calculating all the area lights that come with 3ds Max. HDR Light Studio is easy and intuitive and lets me place the shining spot in the exactly place I want it and see the result at the same time.

Jomar Machado

40 HAIR FARM

In my day-to-day work sometimes I resort to plugins. One of my favourite plugins for 3ds Max is Hair Farm. I use it to produce fuzz for my dinosaur models. It's a pretty powerful yet straightforward plugin that offers fast and phenomenal results if you're after anything hairy, fuzzy or feathery. It can be used to produce scales for dragons, or even petals for flowers.

Damir G Martin

The Red by Vladislav Ociacia

Pilot squad by Vladislav Ociacia

Loish's Tutorial by Victor Hugo Queiroz

PLUGGING IN TO CUSTOM TOOLS

Marcelo Luis Bruno, the creator of MaxToC4D, MaxToMaya and C4DtoMax, on why he created his own bridge plugins

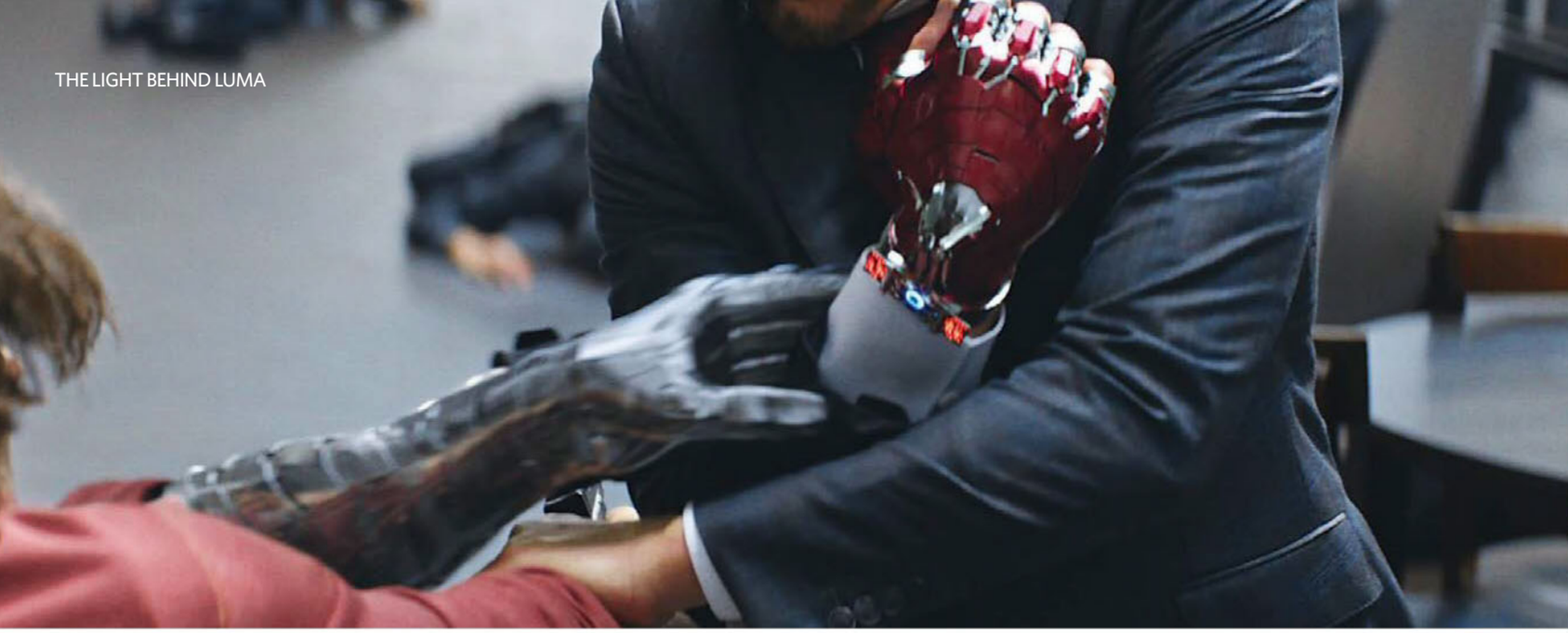
What is your background, and how did you learn to create plugins?
I'm a 3D lover and 3D artist for the last 12 years. When I first saw an animation on TV generated by a computer that they called 'Computed Animation' back in the MS-DOS days, I was in love instantly. I wanted to know how to make that kind of stuff, as I already loved to play with any MS-DOS paint program. At that time I also loved to play with programming in Visual Basic – it always amazed me to create my own stuff. So I learned all by myself, reading lots of manuals and internet info – back in those days not even YouTube was available, it was the beginning of internet – lots of practice (trial and error).

Why did you create your plugins? What was missing from 3ds Max for you?
I love 3D programs. I love to test them all and 3ds Max is one of my main tools, but I feel it's getting old in some areas, whereas other 3D apps are already ahead and modern. So my plugins and ideas are to make Max cool again, with my own ideas after 12 years of use and also inspired by ideas from other software.

Most of the plugins were created for my own needs. When I realised in my day-to-day workflow that something could be improved, I started to think 'What's my approach to solve that', and I started to do some tests and tried to find the workarounds for a better workflow/solution.

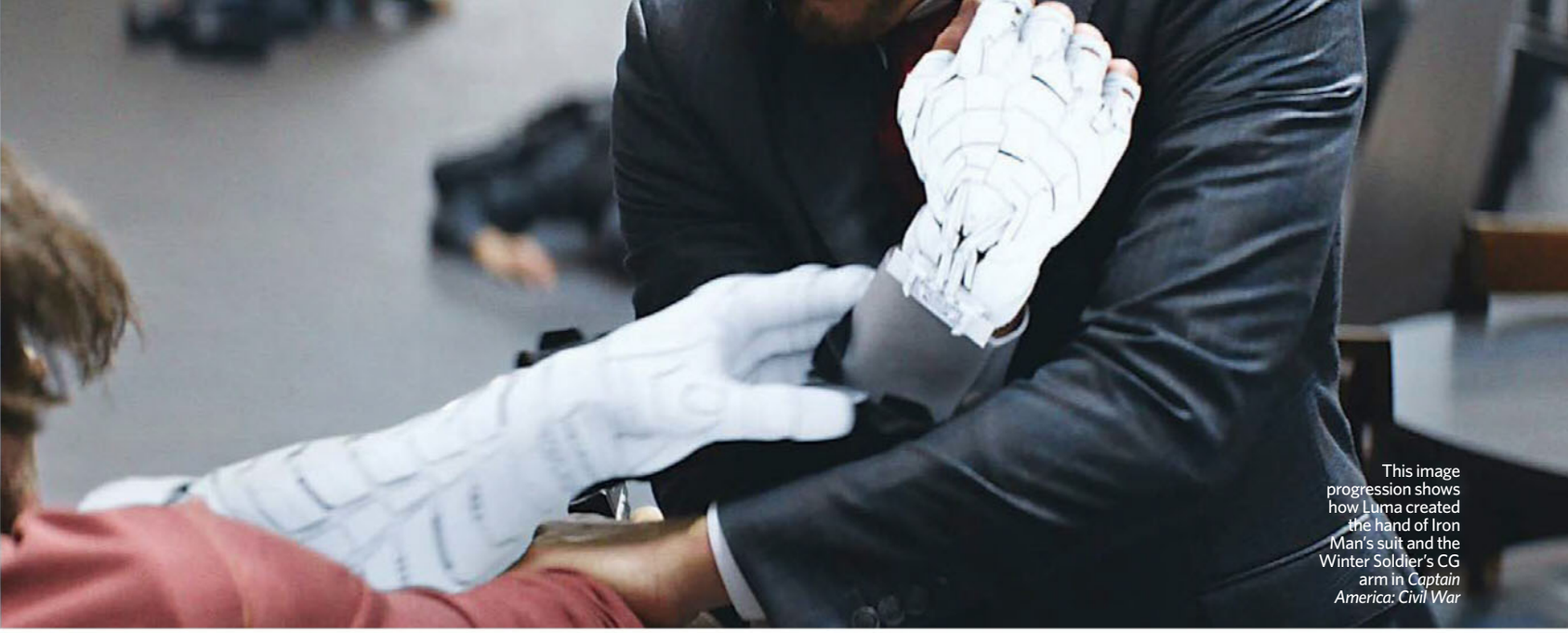
Then, when I see the light at the end of the tunnel, I'll make it more complex and of course my team of programmers are always ready to code!

What kinds of plugins do you have planned for the future?
Updates to MaxToC4D, MaxToMaya, C4DtoMax and soon MaxToHoudini, FunPopMaker (a funny character generator), and two plugins that I believe will be a revolution to the 3ds Max community that I hope will be released in the beginning of 2017. One will change the workflow of 3ds Max with easier-to-access tools and new features not seen before, all in one plugin. And the other plugin is totally focused in character animation, it will make the process of rigging very easy and fun, and also the process of animating it, converting it and so on – and that's just the start.



The Ancient One in *Doctor Strange* conjures up weapons in a London fight scene

Luma crafted the Stone Man that Thor battles in a scene from *Thor: The Dark World*. The CG character required specialised rock modelling and simulation for when it breaks apart



This image progression shows how Luma created the hand of Iron Man's suit and the Winter Soldier's CG arm in *Captain America: Civil War*

The light behind Luma

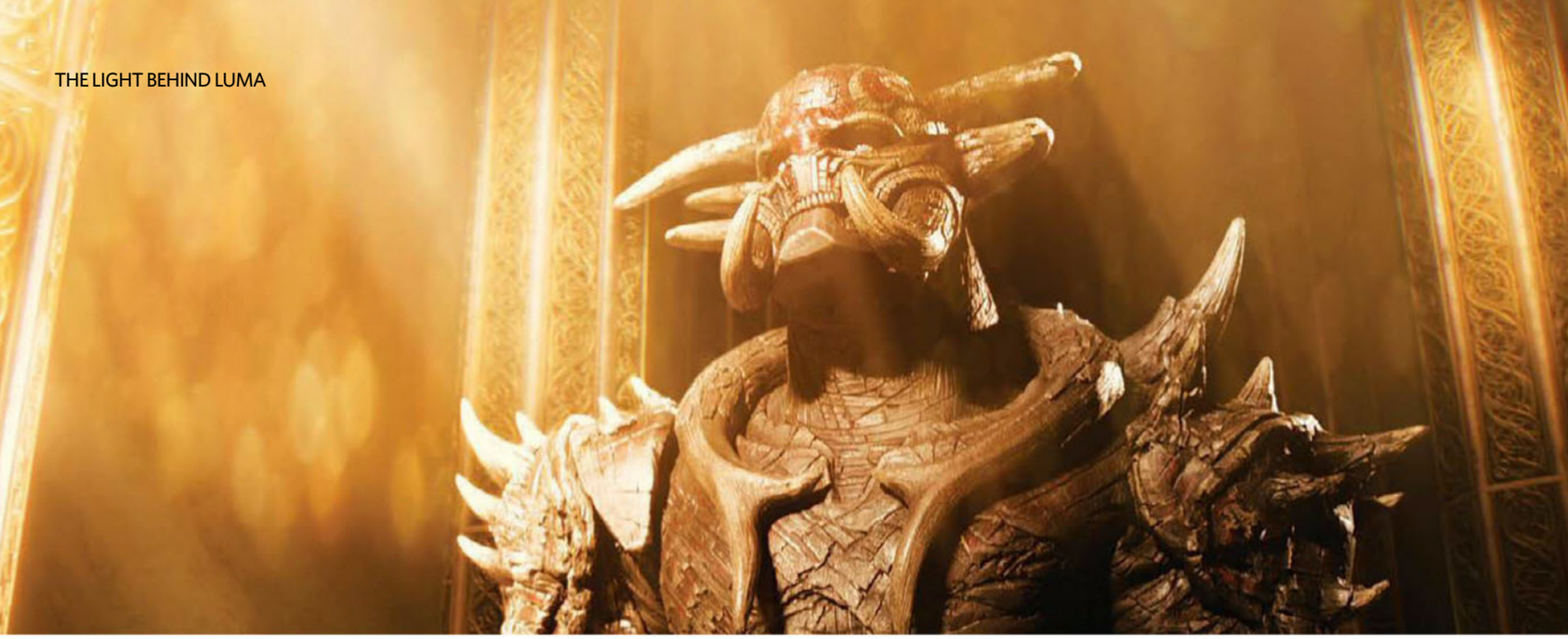
Luma Pictures reveals how it gets to work on some of the biggest films around, and still manages to have fun on the side

If you head over to the website of visual effects studio Luma Pictures, you can watch a short YouTube clip of a prank played by its Melbourne office on their colleagues in Santa Monica, in which they pretended an air raid was happening during a Skype call.

The revenge prank (the Santa Monica office had pretended to the Melbourne team that there was an earthquake in Los Angeles only the day before) is a neat summary of what Luma is as a company – they make astounding visual effects from dual offices, and they have some fun in the process.

But there's a serious side to Luma's work too, evidenced by the astounding work it has made. Among the many highlights of recent Marvel films are several Luma-made VFX sequences, including the metal-slated Destroyer creature in *Thor*, Ant-Man's escape through a cardboard model in his movie, and a repeating confrontation between the dark Dormammu and Benedict Cumberbatch in *Doctor Strange*.

Luma has been making film visual effects since 2002 and has also worked on many other properties, from the *Underworld* films to *No Country For Old Men* and the *Divergent* franchise.



This might all sound like the work of a large VFX facility, but Luma has remained purposefully mid-sized and independent, reaching around 200 artists between its Santa Monica and Melbourne offices. That deliberate attempt to stay nimble and flexible has given the studio an edge in delivering effects services more efficiently than most.

At the same time, Luma has branched out into TV commercials, new media such as mixed reality and virtual reality, and animation. It's become one of those VFX houses that the film studios and producers are eager to hire, and that artists are also extremely eager to work for.

SO, HOW IS LUMA DIFFERENT?

The first difference is Luma's dual localities. While several studios now have multiple offices, Luma has capitalised on having two locations that give it a footing in separate time zones and, with Melbourne, the ability to take advantage of creative industry government incentives.

CG supervisor Andrew Zink also suggests the two offices effectively tag team on projects. "We've built the infrastructure and technology in order to pass any element within our pipeline to one another depending on the time of day and our client's needs," he says.

"[Artists] forge their own ideas for tools and as a result work closely with the riggers and pipeline developers"

Raphael Pimentel,
animation director

Luma is a key proponent of using technology to help produce effects efficiently. The studio has a dedicated development team and was one of the early studios to jump on board Solid Angle's Arnold renderer. Furthermore, artists are, according to Luma animation director Raphael Pimentel, "encouraged to forge their own ideas for tools and as a result work very closely with the riggers, pipeline developers on character rigs, motion libraries, user interfaces and shortcut tools to improve workflow."

Perhaps one of the major differences from other studios – again related to technology – is Luma's amalgamation of its lighting and compositing team. Artists in this area are affectionally known as lompers. "If you are a lighter, you will composite your shots; likewise if you are a compositor, you will light your shots," explains Zink. "It was an out-of-the-box solution to promote an efficient pipeline between departments. As a lighter/compositor, you are responsible for seeing your shot all the way through from the beginning of the lighting pipeline to delivery of the final product."

"This promotes our artists' efficiency by giving them the ultimate control of their shots," adds Zink. "From a compositing standpoint, when our artists breakdown their shots, they immediately

Luma composited live-action photography of Kurse with a digital environment for this sequence in *Thor: The Dark World*

know what passes they need to generate via rendering. The communication lag between compositor to lighter has been eliminated and essentially speeds up our daily workflow. Likewise, as a lighter generating your passes for your comp, you understand when and where you can optimise your light rigs and render settings in order to generate your passes necessary for your comp."

Work on Hollywood films can be incredibly demanding, which is why Luma's artists say inside the company there's a culture that's very different from other studios. A dedicated team ensures employees have a positive work/life balance, something that's sometimes hard to do in the industry. "Luma's culture team makes sure we have the most positive work environment and have fun between and after work hours," says CG supervisor Alexandre Cancado.

Although the studio is not one of the largest, it did go from a small number of employees to 200 while having them operate on two separate continents. That was another challenge for the culture team. "Somehow we manage to get things done smoothly and we pretty much know everyone in both sides," notes Cancado. "We all work hard but at the same time we have a great time. This wouldn't happen without our awesome culture team. It can go from small things like having a snack break every afternoon to both crews going to Hawaii or Fiji," adds Cancado, referring to the end-of-year breaks Luma takes its artists on. "I'm not sure if after all these years I would have the same passion for visual effects as I do now. Luma and its culture plays a very big part in my life and I'm thankful for it."

> "Luma's culture team makes sure that we have the most positive work environment and have fun"
>
> **Alexandre Cancado,** CG supervisor

EVERYTHING LEADS TO DOCTOR STRANGE

Luma's approach to design and technology – and culture – over the years recently culminated in one of the studio's most challenging projects: visual effects for Marvel's *Doctor Strange*, directed by Scott Derrickson. Luma was charged with some shape-shifting battles and realising the climactic Dark Dimension confrontation Strange (Benedict Cumberbatch) has with the evil Dormammu.

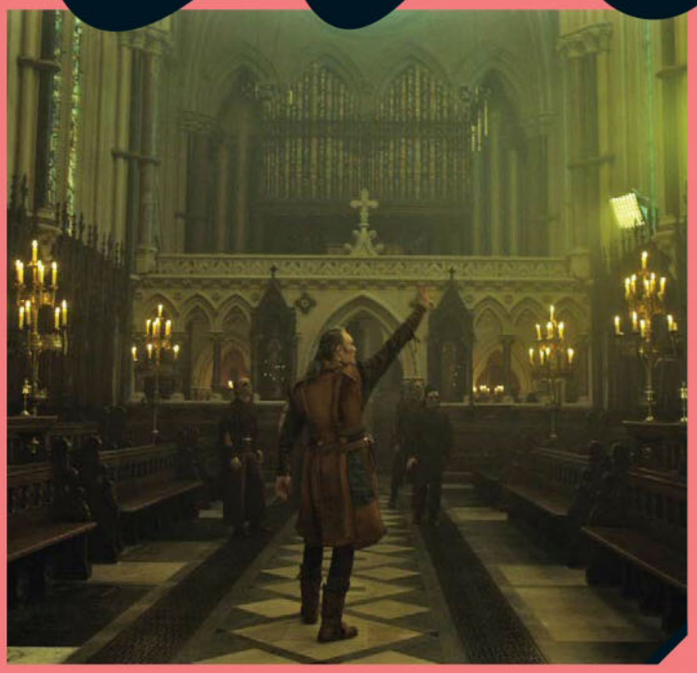
The shape-shifting scenes saw characters able to transform the environments around them inside what is known as the 'Mirror Dimension'. Research into fractals was necessary to complete the work. "Animators worked hand-in-hand with the riggers and the development team to write a 'fractal rig' for the London alleyway battle and cathedral sequence in *Doctor Strange*," describes Pimentel.

A kaleidoscopic view into the Mirror Dimension, which Luma represented with CG imagery and refracting the original photography

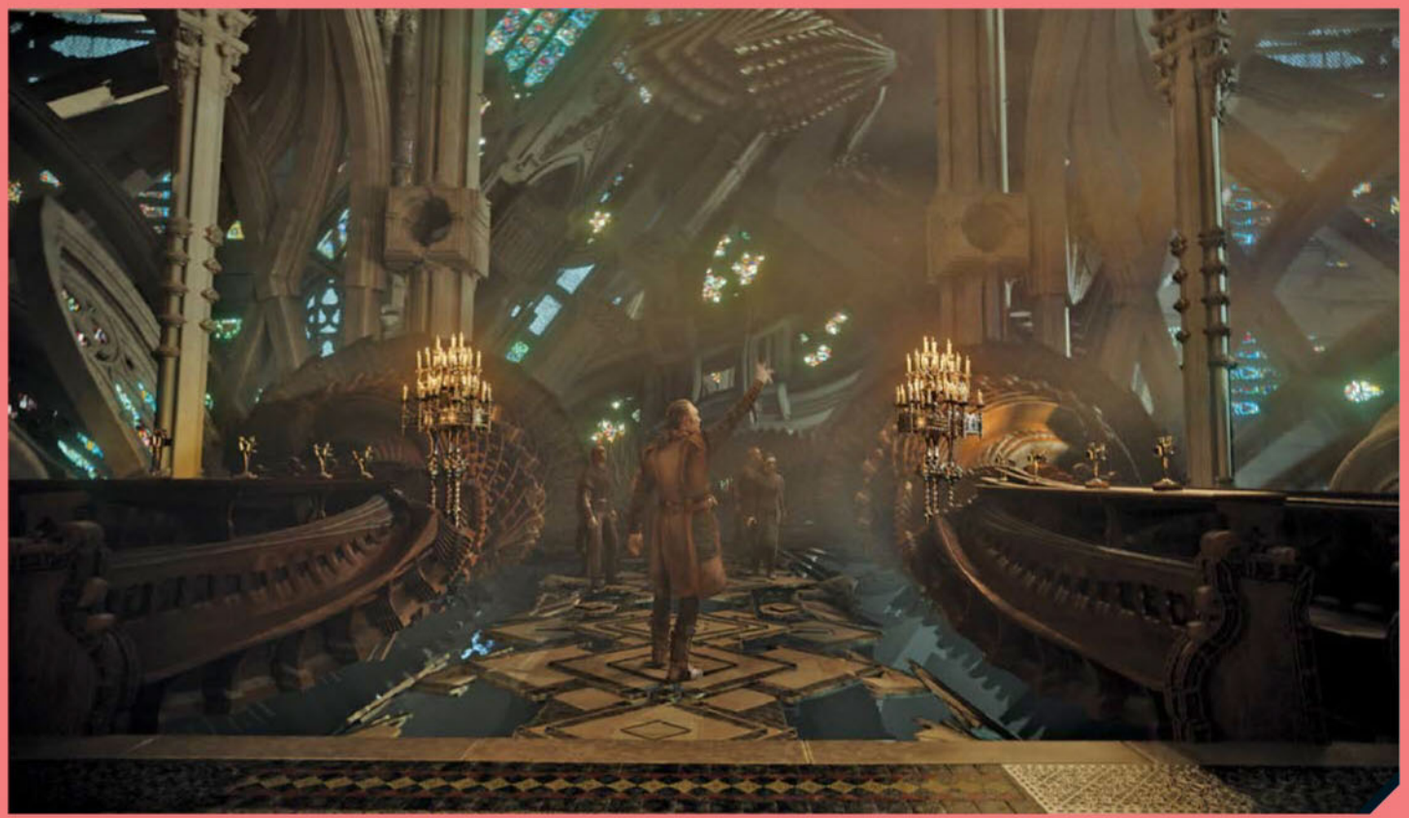
STRANGE FRACTALS IN DOCTOR STRANGE

Luma researched and developed the creation of 3D kaleidoscopic imagery, including fractals and Mandelbrot effects, for 'Mirror Dimension' scenes in Doctor Strange

This sequence takes place in a cathedral – this was the original filmed plate featuring Mads Mikkelsen as Kaecilius, a master of the mystic arts who has turned evil. His powers enable him to bend environments in such a way that normal people cannot even perceive them. On set, Mikkelsen mimed the manipulation of the space and cathedral objects around him, which would later be shown as separate pieces twisting and turning and then replicating themselves in particular fractal-like patterns.



Actual fractal and Mandelbrot equations were plugged into new tools made by Luma to model and then manipulate the geometry via a fractal rig in Maya. Initially, artists animated large forms for basic movement but then layered in true 3D volumetric fractals so that moving pillars, spires, windows and roof areas would all behave in the desired manner. Luma's dev team also wrote shaders and ways to create fractals that gave artists visualisation tools to be able to art direct the final fractal.



The final shot. It turned out that the fractal animation scenes were so complex that Luma was not initially even able to open them, so the visualisation toolset had to go through another round of development just to enable scenes to be opened, worked on, and rendered in Arnold.

"This fractal rig was used in Maya, real-time, giving the animators a visual representation of what would eventually be rendered and seen on screen."

The challenges for the Dormammu confrontation were both creative and technical. First, Luma needed to match some psychedelic imagery established in the original comic books, and deliver a blacklight and almost fluorescent feel to the scenes. 'How do these colourful drawings translate in the movie, and how do we make it look real?' were the questions the Luma crew grappled with. Added to the mix was the villain Dormammu, who had to be made of smoke and fire. Ultimately he would be created from facial motion capture of Cumberbatch himself and some custom-built Luma effects simulations.

Then there were the various planetoids and bridges of the Dark Dimension which filled out the shots. The result was enormous amounts of geometry, something tackled by Luma's development team to ensure the work could even be done. "Before the team was involved, some of our scenes took up to 40 minutes to open, we could barely change frames and our 128-gigabyte machines would quickly run out of memory. That's how heavy it was," says Cancado. "To solve these issues, our dev team had to replace old Alembic files, since these types of cache files were too heavy and slow for us to use. Multiverse was chosen as an option to replace Alembic files. Our development team had to work around the clock to make sure that this technology worked with our pipeline, our main renderer Arnold and other programs. We had to create a lot of proprietary tools to make it reliable and production ready."

> "Our development team had to work around the clock to make sure this technology worked"
>
> **Andrew Zink,**
> CG supervisor

ALWAYS CHANGING

The big film visual effects are the most visible aspects of Luma Pictures' output, but in recent times the company has made efforts to become more of a generator of its own IP and not only a service provider. Led by several in the company, including founder and executive supervisor Payam Shohadai and VP and VFX supervisor Vince Cirelli, Luma is planning an expansion into animated content and its own live-action feature filmmaking.

The idea is to leverage the artistry, skills and technology it has developed already in visual effects, but be the producer and owner of the work. It might just be the future of the industry in general, and Luma seems to be leading the way.

HOW TO WORK AT LUMA

Luma Pictures animation director Raphael Pimentel spells out what the studio looks for in new team members

"There are two key attributes Luma supervisors look for in an artist: talent and being a team player. Talent is talent, but a positive vibe is just as important to us. In the end it's just about creating amazing work while having a good time."

The office environment and outdoor area at Luma Pictures in Melbourne

TEXTU

ULTIMATE TEXTURING WORKSHOP

Get texturing with our selection of six astounding projects and upgrade your models, environments and assets!

With an abundance of tools available nowadays for painting and creating materials, there are myriad methods for creating realistic textures. But then take into account how many types of models can then be improved tenfold and made to look authentic with materials and shaders. Even in the real world, textures aren't as clearcut as simply wear and tear, rust and dirt – there are so many references that can be observed for creating real randomness that the possibilities are endless. So it's understandable, then, that there's so much variation even in a texture artist's portfolio and you can see this distinction in the work of Jacob Norris, lead environment artist at NVIDIA and CEO of PurePolygons, who creates fantastic natural environments that contrast well with his moody, man-made city scenes. Norris uses Substance Designer in his work, whereas Wiktor Öhman used Quixel SUITE and the NDO and DDO Painter tools to texture an outer space station. We take a dive into some amazing renders and find out how these artists created jaw-droppingly realistic textures in their own words.

DAMAGE TEXTURES FOR GAME ASSETS

Elliot Sharp details how to texture game-ready realistic, random damage for armour and weapons

ELLIOT SHARP
Freelance 3D artist
www.mfz.artstation.com

What is your professional background?
I started my 3D career as a product designer, creating new products and rendering them for a handful of clients. This was my first real exposure to hard-surface work, and I knew I could use those skills to do something I was more passionate about. I've always loved games, so I began to study the workflows and techniques employed in the industry and worked hard to build up a portfolio. Then I began my slow, steady pivot from product designer into freelance game artist. The latest game I've had the pleasure of contracting on was *Warframe*, which was a really beautiful universe to work in.

Can you explain your process for creating wear and tear/damage on the Gilded Oval Shield?
I'm a firm believer that any good prop texture starts with a great bake. ZBrush played a big role in establishing the secondary forms and adding surface deformation. Quite a bit of sculpting was also done to emulate different styles of weapon damage on the shield face. When making large surface changes to a mesh in ZBrush, I'll assign a new Polygroup before completely dropping the masking. I do this for fast PolyPaint/Material ID assignment, which can speed up texturing. Any time I start a project in Substance Painter I make a masked folder for each Material ID. I use loads of fill layers with modified Cavity and Ambient Occlusion masks to get my surface definition going, and then I do quite a bit of custom masking. I think the key is to use procedural and map-based generation to get real-world randomness, and then custom paint details that add character.

Gilded Oval Shield by Elliot Sharp

What should artists bear in mind when texturing hard-surface models?
I think the baking fundamentals are always going to play a major role in how your textures turn out. Take the time to make sure your UVs are efficient, that your low poly smooths correctly and always bake with a cage. Getting great bakes is the first step to getting great textures. Keep in mind the world scale of your model as you texture, and make sure that the details you're adding make sense. Use procedural textures to make surfaces varied in a realistic way. Don't be afraid to add your own touch and give your prop a story.

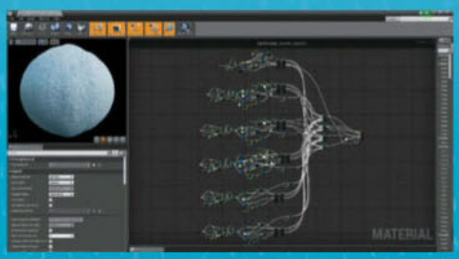
MASTER ENVIRONMENT TEXTURES

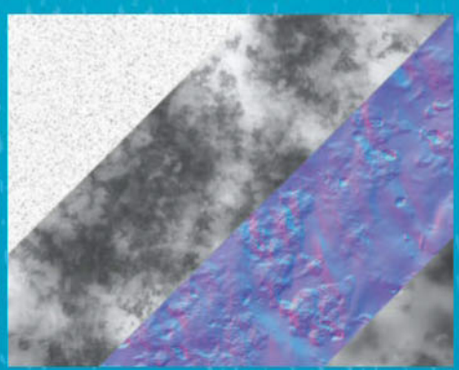
Games industry veteran Jacob Norris gives us the lowdown on texturing stunning natural scenes

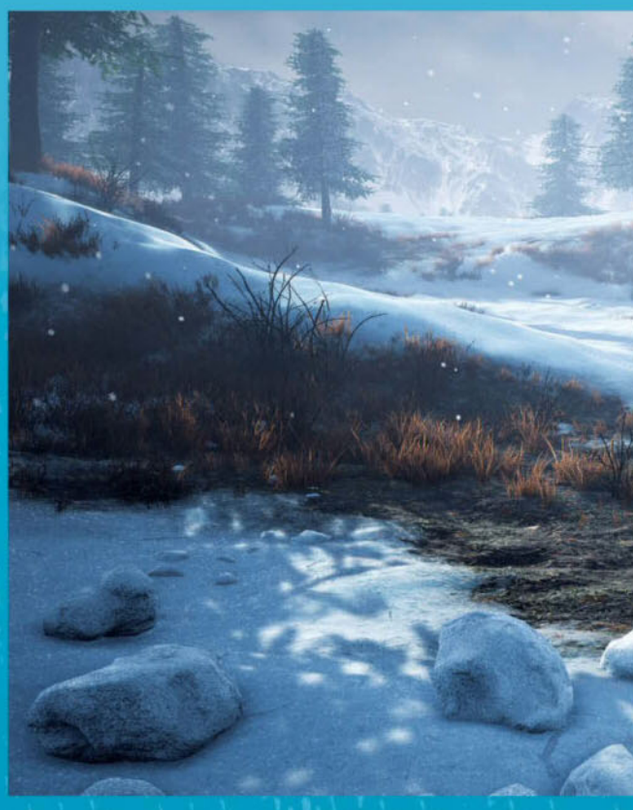
JACOB NORRIS
Lead environment artist, NVIDIA
www.purepolygons.com

What drives you to create such beautiful environment textures?
A lot of my inspiration comes from other artists and of course the natural beauty of the world itself. I often find myself saving tons of images from Google of beautiful nature scenes, incredible skylines, or even just a dark alleyway with nice composition and details. It doesn't really matter if it's from real life or digitally created – if it's beautiful, I want to make it at some point!

Can you tell us some of the tools and software that you will typically employ for texturing a realistic environment?
There are generally three or four go-to pieces of software that you will find in almost all of my







HEG4L DRON
by Xabier Urrutia

TEXTURING WITHOUT MAPS

Xabier Urrutia explains how to merge different passes in an image with KeyShot and Photoshop

XABIER URRUTIA
Freelance artist
artstation.com/artist/xabierurrutia

01 Create the clean pass In KeyShot, I import the 3D model from 3ds Max and select and modify the desired materials from the Material Library. I also create some labels that can be projected onto the model to enhance realism and make it look like a practical tool.

02 Render passes In KeyShot, I duplicate the model to create two more passes. First I create a Scratch pass, where I change each material to an aged state. The last pass is simply changing all materials for dry mud. Finally, I render all the passes from the same camera angle. Mostly I start with one of the smart materials that Substance Painter offers and from there I start to adjust it.

03 Create scratch materials In Photoshop, I put the Metal layer on top the clean pass. I create a black mask for the Metal layer so that it is invisible and I start to bring the metal out by painting white strokes in the mask. I put the scratches mostly in corners and joints so it looks like it's been used.

04 Make it muddy Over the scratches pass I put the mud pass and I repeat the masking process. I think of places where dust and mud would concentrate most, and I also paint some zones where water drops have carried mud and left some trails. I keep the corners clean and make it dirtier around the modelled mud pieces.

Forest Snow Ground
by Jacob Norris

creations. First, the tools to create the artwork itself usually fall between ZBrush, Substance and Photoshop. Then of course once the artwork is finished you need something to render it in, so that will generally be either Marmoset Toolbag or the Unreal Engine to show off the artwork in a real-time game engine.

What are the similarities and differences when texturing a natural environment as opposed to man-made environments?
The similarities of course are always the use and gathering of many, many reference images, no matter what the content of the artwork. Also the use of trial and error when creating something new. In some cases I will have created as many as three to five different versions of the same thing just to see what direction I want to go in or what style works best for the scene. It's always nice when it works out the first time, though. As for differences, I would say that for me buildings and man-made things always need to fit into each other with specifically placed walls, doorways, sidewalks and so on. But with nature, you can really have fun with it and compose it however you want. You have so much more freedom. Unless of course it's a destroyed man-made environment and then you can do whatever the heck you want with it.

Which of those two kinds of scenes – natural environments or man-made landscapes – do you enjoy working on more and why?
I personally enjoy the more natural environments, in the sense that they are so much less restricting. Similar to what I mentioned before, I feel like there is so much more freedom when you are creating them. There is a lot more room for creativity and imagination. It can still be very difficult to create natural things, but once you get the hang of it, it's just so much more natural to let the artwork flow out with nature environments.

Can you explain how you went about the texturing process for the snow in your *Forest Snow Ground* render?
The snow in the scene was textured entirely inside of Substance Designer. It consists of two separate materials, a 'rough-looking snow' that is more beat-up and walked in and a 'soft snow' that feels like it is more naturally laying on the ground. Then there is a detail 'snow flake layer' that is added on top of the material inside of the Unreal Engine.

The thing that really brings it all together, though, is the Subsurface material that I have set up in Unreal Engine 4. The way the light interacts with it and shines through small areas of the snow on hilltops really sells the realism of it all.

Desert Mech by Mahmoud Salah. Concept by Nivanh Chanthara

HIGH RESOLUTION HARD SURFACE TEXTURES

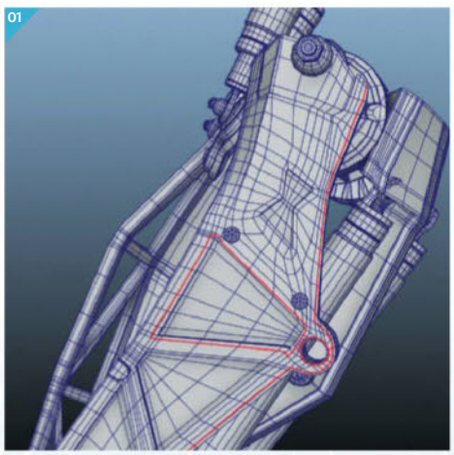
Mahmoud Salah teaches us how to prepare a mech for Substance Painter with this work from his films mentorship programme at Think Tank

MAHMOUD SALAH
3D modeller/texture artist
www.mahmoudsalah.xyz

01 Set up your model for Substance Painter When modelling and UVing a hard-surface object, there are some rules to take care of: your mesh should have even poly space and quads for a clean topology, and crease your edges to avoid stretches. Pay attention while working with UDIMs and Substance Painter, since you will import one object and Substance Painter will separate them into a texture set. You should always arrange your UDIM's tiles, which will help you work faster.

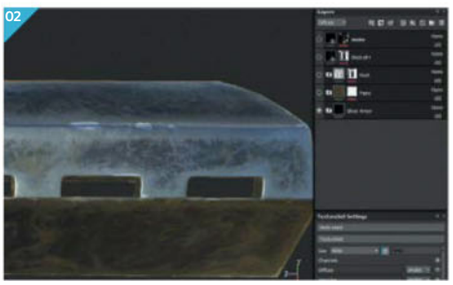
02 Create Smart Materials After you import your mesh and bake textures (Ambient Occlusion, Curvature, World Space Normal and so on) you're ready to make awesome materials. The way I like to think while I am working with Substance Painter is of how real materials should work – for example, for a metal material there will be a base metal on top of it, then the paint layer on top of it then rust on top of that and maybe some dirt. Mostly I start with one of the smart materials that Substance Painter offers and from there I start to adjust it.

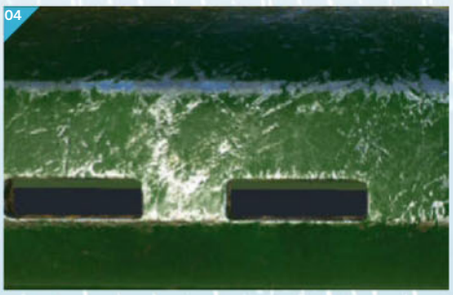
03 Add logos For coloured logos you can easily use a Projection tool on a new layer.



For engraved logos you can add a fill layer and then add a black mask and draw the logo with white using a stencil, then on the Material Properties give the Height channel a negative value to carve it into the object. Then you can adjust the Diffuse layer's Opacity as you want.

04 Tweak stitches For stitches I used the Stitches brush in Substance Painter and then adjusted it depending on the fabric type, like the spacing and the shape of it, and added some Height value on the Material Properties for the brush for when painting with colour, Spec and Height. To get more realism you can use a tileable seamless texture in any of the material channels.





REALISTIC SKIN FOR CHARACTERS

HoOman Raad explains his use of Displacement maps from Texturing.xyz to create photoreal textures

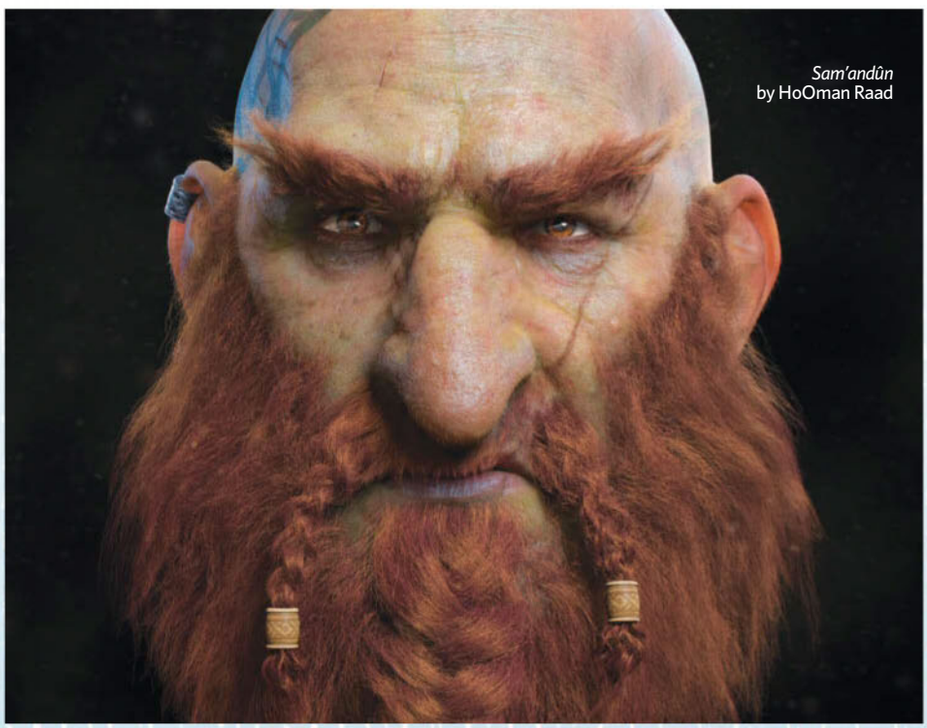
HOOMAN RAAD
3D character artist, Arna Studio
www.hooman.artstation.com

Where does your love for characters come from?
Since my early days in this career my main motivation was only to create! When I make a creature and the result is lifelike – as if it could be a real being in another parallel universe – it really is a rewarding and amazing feeling! Getting to this point is both challenging and encouraging.

How did you make the skin for the dwarf Sam'andûn lifelike? Can you detail your process?
My intention for making this was to improve my skills for making fur and hair, but I ended up conducting some tests on the skin too. At first I gathered lots of references for both hair and skin, obviously, and later was inspired by a concept by a friend of mine. By closely observing the references I made a list of all the things that can make a face look real and alive, and set my objective to implement those on my model: things like diversity of details, the wrinkles, scattering pattern of short and long hair, greasiness of the skin and so on.

Can you explain how you used the Texturing.xyz site and some of maps on there to texture Sam'andûn, and is this a process you use to normally texture characters?
Actually it was my first time using this method. There were some tutorials on www.texturing.xyz website and I textured the model based on their descriptions. I had to make a few tweaks to the instructions, for example with the Alpha map that I made from texturing.xyz, I masked it as reversed and applied a negative Deformation/Inflate value, but overall the documentation was thorough and practical. I'm not fully satisfied with my final result but it's acceptable for my first try I guess.

What's the most important thing to remember when texturing skin?
Here are some of the experiences I've gathered: to texture a real-looking character, say for a film or animation, I make a list of all the things that provides more of an 'alive' feel to the skin, and then try to implement those on the model as you go on making it. You should remove the effects of light, reflection and ambience from textures to have a better Albedo map. During the process, whenever you feel you don't actually know where you are going and what you should do, which might happen a lot if you are new to the process like me, take a step back, stop whatever you are doing and go back to observing your references for some time. The solution will show itself! And also the Spec map really should feature intense and exaggerated details!



Sam'andûn
by HoOman Raad

THE TEXTURE BAKING RECIPE FOR SUCCESS

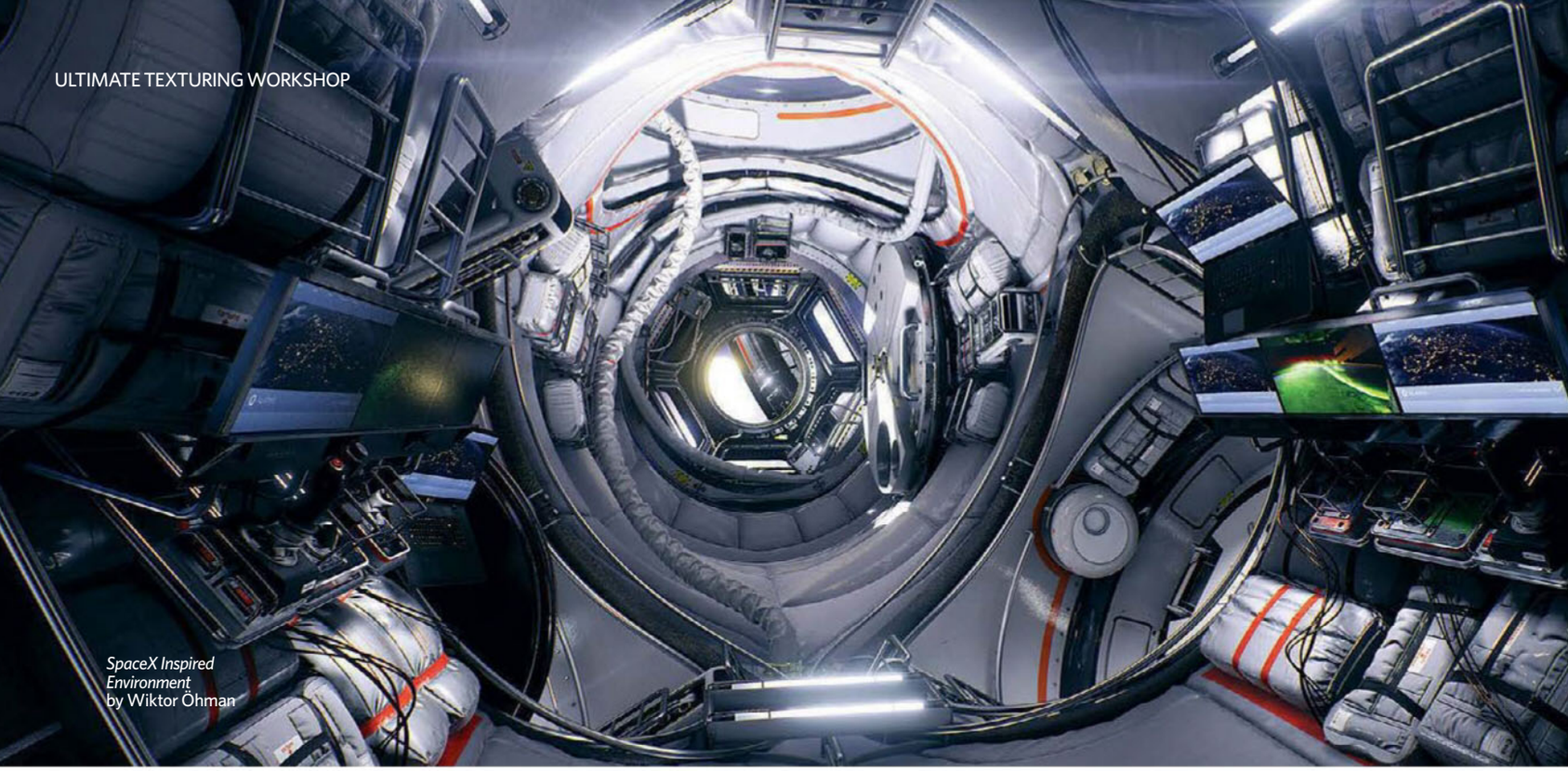
3D artist Sami Tarvainen explains texture baking and solutions to common mistakes

What software do you use for texture baking and why?
I use Substance Painter for baking textures and the reason for it is that it simplifies my workflow, which is great because now I can do more in the same amount of time and everything in one software. Also Substance Painter offers a lot of different options for baking and presets for exporting.

Have you always used Blender and Substance Painter? If not, why did you choose to move to this combination of the two apps?
I have used a bunch of different software for texture baking before Blender and Substance Painter: 3ds Max, Crazybump and ZBrush just to name a few. The reason for why I started using Substance Painter is because it simplifies my workflow and Blender was just something I wanted to learn to use because it differs a quite a bit from 3ds Max and Maya. And now, I don't want to change to other software because the shortcuts are in my muscle memory.

Are there any cons to using Blender for texture baking?
Well, not exactly cons, but when it comes to baking textures, Blender has the common baking options for different maps, but it is not as versatile as Substance Painter and in some cases baking textures can take a lot of raw processing power and memory. However, it gets the job done just fine as well. I think it's good to remember that any software is only as good as you are.

Do you have fixes for any common texture baking mistakes that you see or hear other artists encountering?
It depends on what you're doing, but when you bake from high resolution to low resolution, try to keep your UV maps vertically or horizontally aligned and avoid unwrapping UVs in a way that they 'bend' or 'curve'. The other thing that comes to my mind right now is overlapping UVs. I suggest not to overlap because it makes everything really complicated and you need a lot of preliminary designing – otherwise you will end up with a skewed bake and fixing that is really time-consuming and frustrating, so it's not worth it.



SpaceX Inspired Environment by Wiktor Öhman

TEXTURE A SCENE IN ONE DAY

How Wiktor Öhman textured a space station for the VR experience Homebound with Quixel SUITE

WIKTOR ÖHMAN
Art lead, Quixel
artbywiktor.com

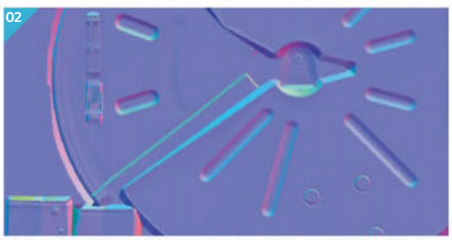
01 Prepare your models and bakes To start texturing models with the SUITE you first need to have a finished and UV-mapped model. Both high and low-poly models work with the SUITE. I baked an AO, Normal and Color ID map. The Color ID is to separate areas of the mesh into groups that you can assign different materials to.

02 Detail with NDO The SUITE consists of NDO, DDO and 3DO. NDO is a normal creation toolkit, DDO is a texturing toolkit and 3DO is a real-time PBR previewer. On most of my models I took them through NDO to add definition and fidelity. It's a faster way of adding complex details.

03 Set up your DDO project Once the Normal map is done, setting up the DDO project is super easy. Simply specify your model and the baked maps, set your resolution and hit Create. You can also use presets that link certain colours to pre-made materials. I used this technique for almost all the models in the scene.

04 Texture with presets Presets come bundled with the SUITE and can also be created yourself. What they do is link materials assigned to Color IDs in your project. If you save the ID preset and load it for future projects you'll get rubber assigned to that pink ID. This process saved me loads of hours.


01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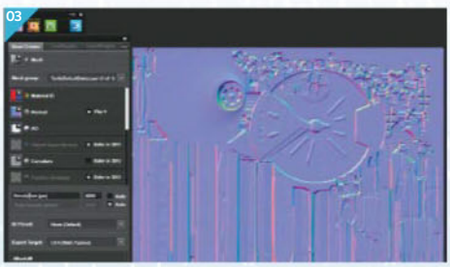
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04

FUNDAMENTALS OF PBR

Texture and shader artist Ana M Rodriguez teaches us to work with PBR

What is PBR texturing and why use it?
Physically based rendering is a real-time rendering technique, which consists basically of using realistic illumination with real-life based materials to make them respond in an accurate physical way in order to represent lifelike environments/materials. If you are going to create an object using a PBR material, you have to be very careful to understand how this material should work with the light and both parts have to set up charts for the correct material behaviour (the way they respond to light) and try to follow this approach to maintain a believable cohesion.

How do you texture in PBR?
Making textures in PBR is not different from how the textures were done previously, at least not in its initial approach. The essential difference when it comes to tackling a PBR pipeline is in how the material is broken down in the different maps that compose it (Albedo, Roughness, Metalness and so on), that is to say, in the approach of a texture with Diffuse/Specular/Normal. The Diffuse map has a great importance, an almost 'pictorial' importance you could say, while in PBR the Albedo (equivalent to the Diffuse map) is a more disaggregated component of the final material so it must be treated smoothly, without shadows and without overadding information that increases the noise to the map and prevents the light from working well with the other channels.


IMAGE COURTESY OF ALI JALALI
ZBRUSH 4R7®
Pixologic
PIXOLOGIC.COM
THE ALL-IN-ONE DIGITAL SCULPTING SOLUTION.
DESIGNED FOR THE PURSUIT OF ART.

The Pipeline

Expert advice from industry professionals, taking you from concept to completion
All tutorial files can be downloaded from: **filesilo.co.uk/3dartist**

Develop soft organic forms in ZBrush

Discover how to create your own fanstastical creature in 20 steps, from concept creation all the way through to the final render

This tutorial will cover a full walkthrough of how to design, model, paint, retopologise and render an alien creature, introducing the tools and techniques needed along the way. We'll use ZBrush for designing, sculpting and painting, Maya and ZBrush for retopology and UV work, xNormal and TopoGun for texture baking, Photoshop and Quixel for texture polishing and Marmoset and Photoshop for the final image render. We'll start by covering sculpting and shape design of creatures as well as the importance of anatomy research to help the process. After that, techniques will be explored for colour, composition and design to help aid the sculpture. The last part will cover the technical execution of taking the high-res sculpt and bringing it into real-time rendering software with lower-res topology and texture maps applied.

TYLER SMITH
Ant Fella, 2016

Software

ZBrush, Maya, TopoGun, Photoshop, Quixel, xNormal, Marmoset Toolbag

Learn how to

- Understand the elements of what makes a good creature design
- Understand the importance of research and study of animal anatomy
- Use ArrayMesh in ZBrush to generate quick, complex segmented shapes
- Sculpt soft organic forms
- Sculpt hard exoskeleton forms
- Paint organic forms in ZBrush
- Extract texture maps
- Render low poly-assets in Marmoset

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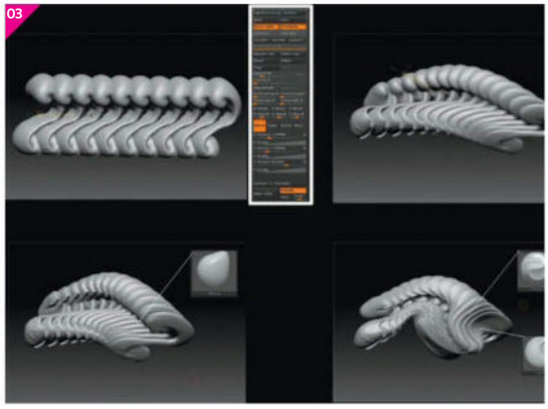
- Tutorial files
- Tutorial screenshots

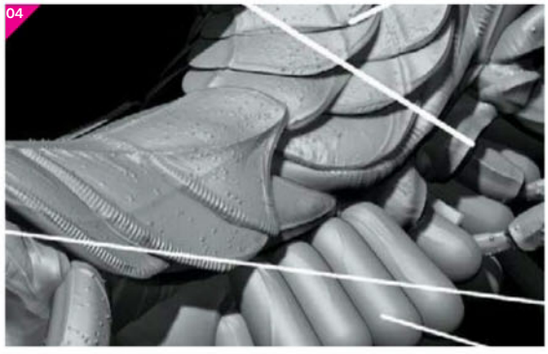
01 Elements of good design For establishing a good design, there are always three main pillars to try to keep in mind: an appealing balance of shapes and detail, functionality of the creature's anatomy or how the creature is built in a way that makes sense, and the emotional aesthetic connection those shapes and details convey to the viewer. For shape guidelines, look to the rule of thirds, the golden ratio and lines that lead the eye through to the creature. For functionality in the design, make sure the creature can hold its own mass and that there is a good sense of solidarity to its limbs, head and body. For emotional aesthetics, look at what kind of shapes are being conveyed (such as sharp, soft, smooth or rugged). Other aspects are things like facial features (would you opt for big bug eyes or dim, beady little eyes?).

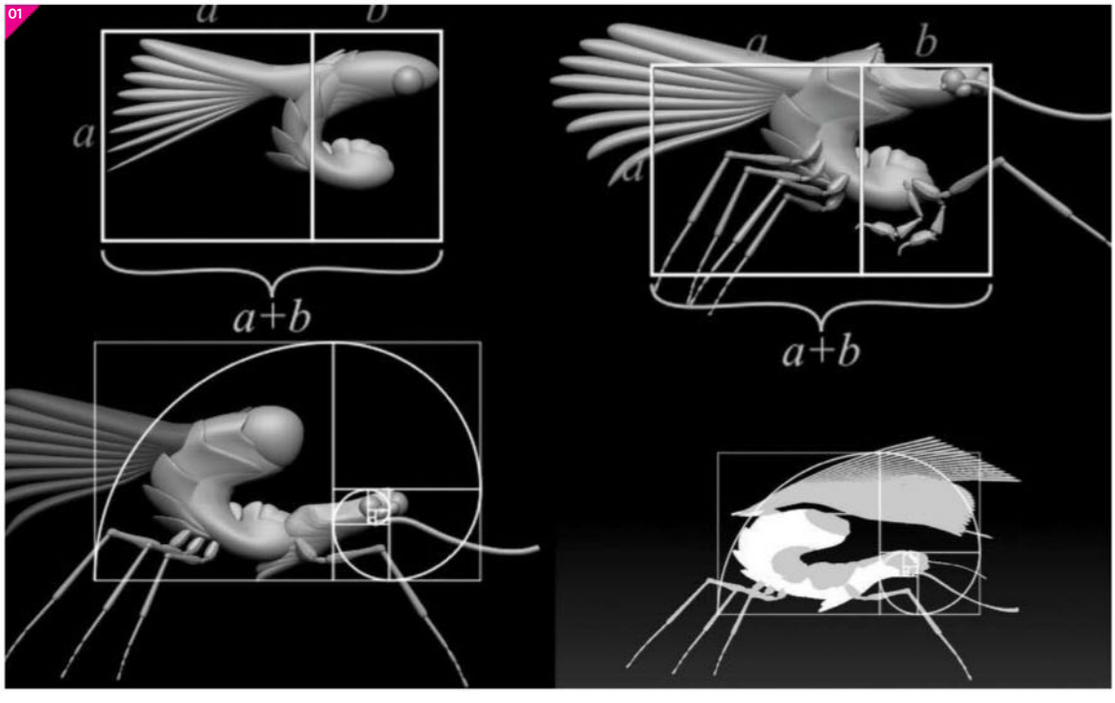
02 Importance of understanding anatomy Understanding animal anatomy is one of the essential skills needed for good creature design or any organic design. Any creature artist who dedicates time to animal anatomy is guaranteed to see their work improve immensely. Good resources to start with when developing your anatomy skills are books by Gottfried Bammes, Ken Hultgren and Terryl Whitlatch. Another good source, of course, are websites like Google and Pinterest, especially if you are doing any insects or crustacean-like creatures. While finding art books on non-mammal anatomy is a little trickier, there are tons of scientific anatomy illustrations online for almost any animal you can think of.

03 Techniques for quick organic shape design Start with a simple DynaMesh sphere and start pushing and pulling the shape with the Move brush to establish a torso. Then begin playing with the Spiral and Pinch brushes to break up the main torso shape into a harmony of big and small shapes moving along a primary curve.

04 Begin anatomy sculpting and research before diving in When beginning to lay in the anatomy to the primary shapes, it's important to keep in mind the functionality of why the muscle and bone groups are there and what purpose they serve for the creature in its habitat. If it's a nimble spindly creature that relies on strength, look at creatures like spiders or primates. If you want a powerful, large creature, look at bovines, packaderms, beetles and the like. Going and researching just how nature engineers how a living thing can function within its environment is key. For this creature at this stage it has a hard exoskeleton on top like a scorpion with a fleshy underbelly carrying eggs like a prawn.

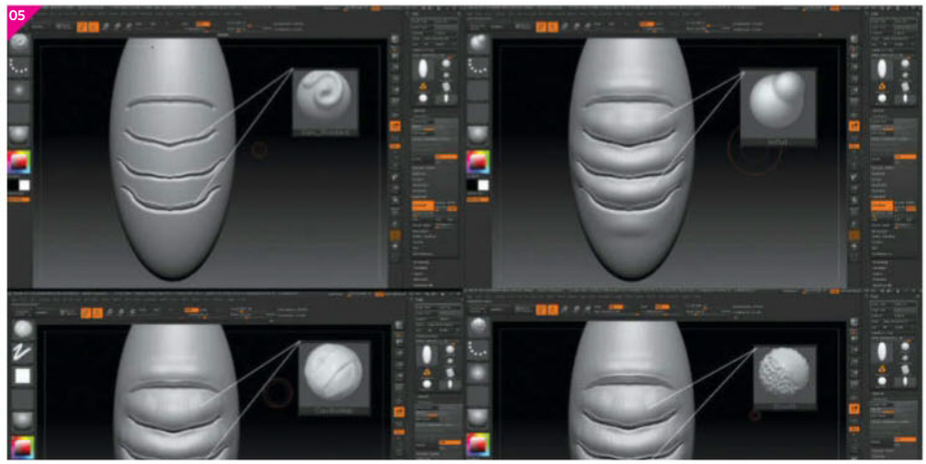


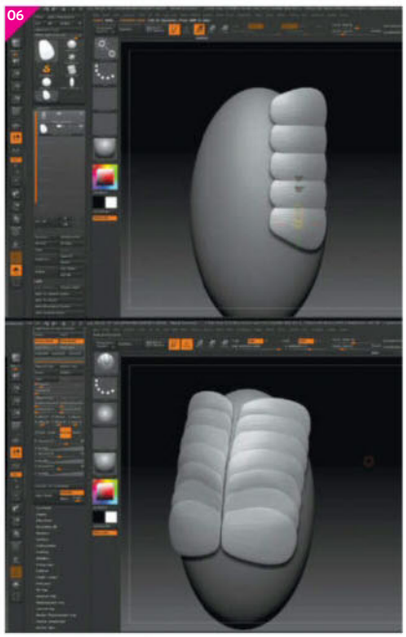


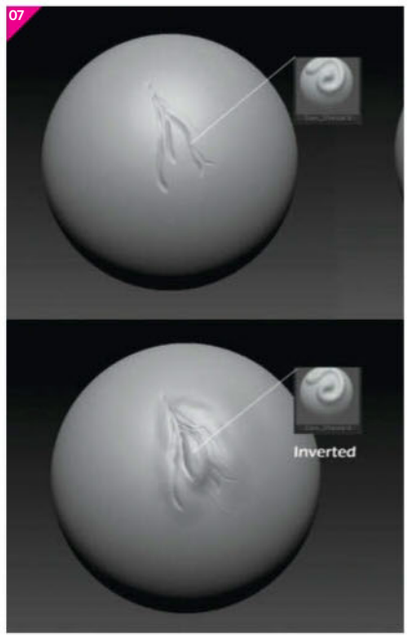


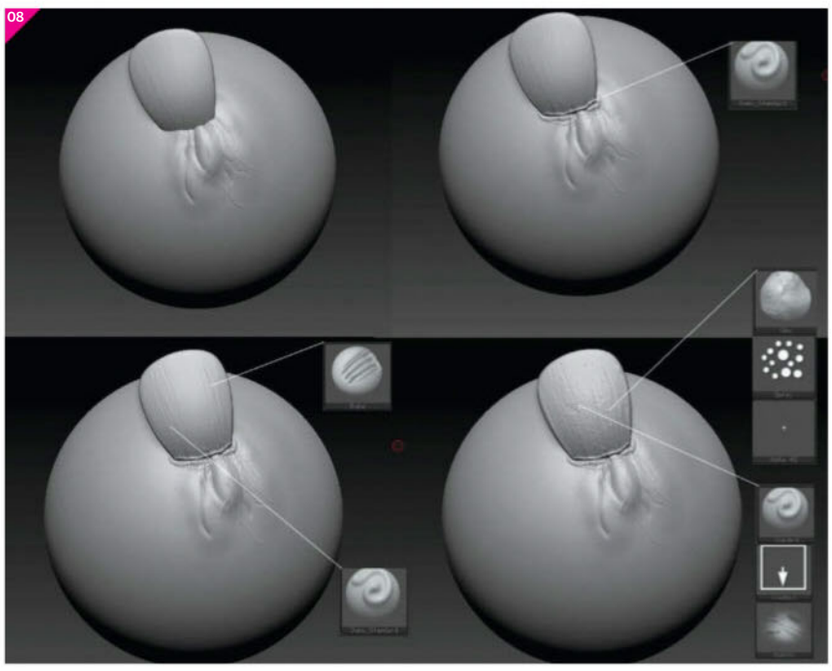
Techniques for ArrayMesh generation

A technique that is great to use when designing organic forms is taking a simple shape and using the ArrayMesh tab in ZBrush to move and repeat the form in a spline duplicate manner to get a ribbed/segmented effect. The Scale, Rotate and Pivot sliders can help get interesting shapes with the array copies that can lead to happy accidents in the shape design. Once the array adjusting has been established, the Move and Pinch brushes can be used to tweak the overall contour shape of the new ArrayMesh.









05 Sculpt soft organic anatomy For sculpting the underbelly, first work on carving in the segments with the Dam_Standard or Mesh Cut brush where the flesh can move. After the lines have been carved in, take the Inflate brush and bulge up the areas around the segments to achieve a nice, strong change of form from segment to segment. Once the big forms have been established, take the Clay Buildup brush and gently lay in light strokes that follow the flow of the muscle fibres in the form. This helps convey muscle indication under the skin without being to jarring and it breaks up the perfectly clean CG look of the flesh.

06 Sculpt hard organic anatomy For sculpting shells, the best technique is creating a shell mesh piece and use the ArrayMesh to stack them along the body rather than try to carve in every shell piece into a single mesh. Once the shell pieces are laid in, use the Dam_Standard or Mesh Cut brush to carve accents in along the edge. Using LazyMouse will help to keep the strokes clean and orderly. One other technique to use with the LazyMouse is if the Lazy Step is put at a value of 0.7 and a Stamp Alpha is selected, the stroke can lay down an interesting stepped pattern along the edge of the shell.

07 Sculpt soft organic materials The major features that make up a soft organic surface are wrinkles, veins and blemishes. For sculpting wrinkles, the Dam_Standard is a great way to carve in the base of the fold. Keep in mind wrinkles behave in a way like tight fabric, so they only occur near either points of tension where the flesh moves or holds weight. Once the wrinkle lines are carved in, use the Inflate brush to billow out the flesh around the lines to create the pillow fleshy effect. For veins just invert the value of the Dam_Standard and draw on the surface, paying attention to the way veins are laid out and how they branch out, it is a good idea to have reference of veins when drawing them. The most simple and fun technique then is boils, which consists of taking the Clay brush setting the stroke to Spray and selecting a small dot-like Alpha, then just spraying the pimples and boils onto the surface.

08 Sculpt hard organic materials When sculpting hard organic surfaces like horns, shells or claws and the like, the most important thing is to understand how a hard organic surface fits and transfers into a soft organic surface. Look at your fingernails and see the lines and borders of skin that separate the hard nail from the skin of your finger. With

this in mind use the Dam_Standard to establish the lines and hard edges that separate the two organic forms from each other. For the shell surface use the Rake/Dam_Standard to create the lines and ridges of chitin that make up a shell, as well as using the Clay brush with the Spray stroke to create the hard dots and circles that occur on the shell's surface.

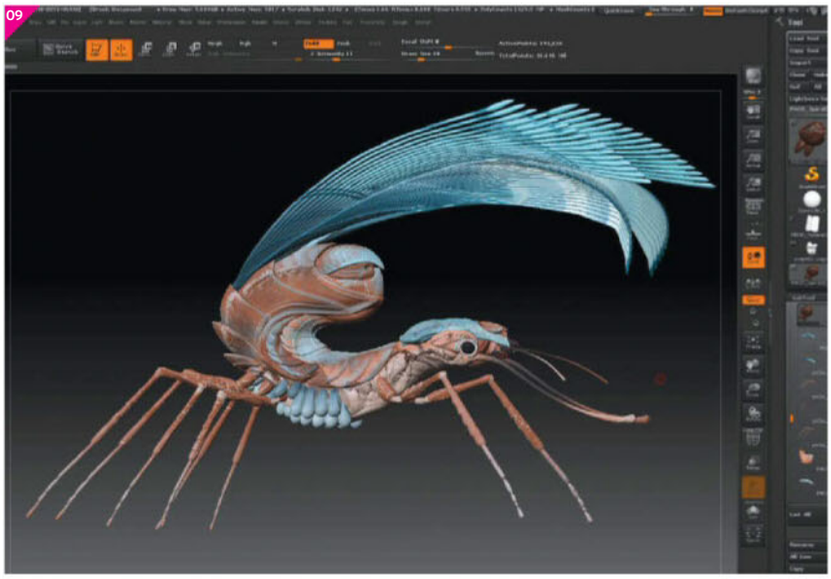
09 Paint organic materials and colour composition When setting out to paint the colour of a creature, always keep in mind that the vibrancy and saturation of the colour should be used to enhance the composition that has been established in the sculpture. If the face is the part that you want to stand out the most, make sure that the colour value, difference and vibrancy is located around that area to attract the viewer's attention. A good jumping off point to start when painting a creature is to remember that most creatures have a different – usually lighter – colour for their underbelly or any area that is facing downward. If you want to have any stripes or patterns on the creature they usually work best on the back ridge.

10 Paint with ZBrush masks Once the primary colour features are laid in, it's time to start using the ZBrush masking features to enhance the sculpted detail. The first one we'll use is Mask By Smoothness to isolate the least smooth elements of the sculpture. It is usually good to play it by ear to see which isolated details would look better with a darker or lighter value. The next one is Mask By Peaks And Valleys with a Range set to 15 and Coverage set to 7. It is a good idea to sharpen this mask to keep it nice and crisp, then paint in the values using the same principle of judging which values and colours would work best to bring out the details. The last one is Mask By Cavity. Be very careful not to use this one too heavily, since the Cavity texture map will do most of the work bringing out the detail here.

11 Retopology process in ZBrush and TopoGun A good technique to retopologise a complex organic mesh in ZBrush is to make it a single mesh then use a low DynaMesh setting to create the simple pillow shape that still holds the same contour as the high-res mesh. One thing to keep in mind with this technique is to seek out and get rid of any holes or 'Swiss cheese'-style features in the DynaMesh in order to keep the ZRemesher from generating unwanted topology. To do this, just use the Inflate brush to close up any holes, then re-DynaMesh to rearrange the topology again. As soon as the mesh is free of any holes or sharp edges use the ZRemesher with a low Count and high Adaptive setting to generate the low-poly version. If specific retopology is needed, the tools in TopoGun can be used to hand draw the topology. You can also use the Delete Loops tool to get rid of any useless edge loops as well.

12 UV work in ZBrush and Maya UV Master in ZBrush is an excellent way to generate any organic UV sets you may need. If you need your seams to be in specific places, two good techniques to control them are using PolyGroups to generate specific UV islands and using control painting to paint in where the seams should go. To efficiently pack the UV shells one good technique is merging all the low-res meshes into one in ZBrush and using UV Master to pack them. For more control, simply just pack them by hand using the UV tools in Maya.

09



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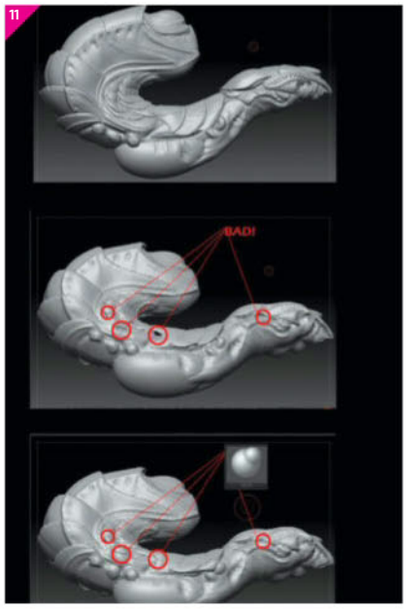

Painting patterns in ZBrush

Another great way to use the lazy step feature is with painting as well as sculpting. Selecting any number of Alphas can lead to those happy accidents we long for with painting patterns on the model.

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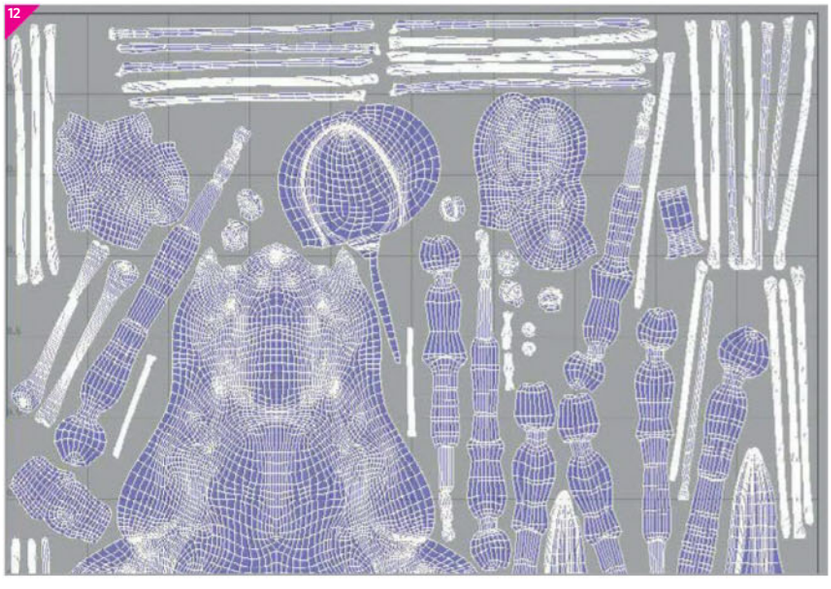

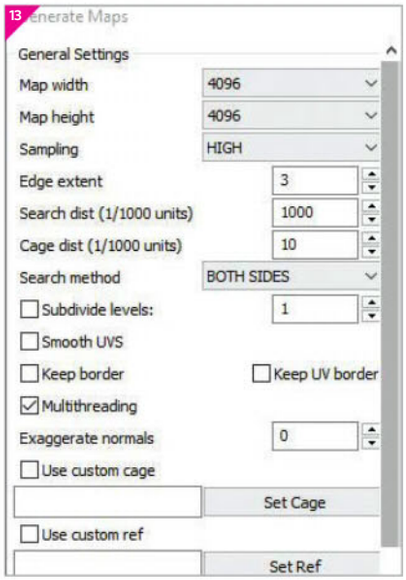

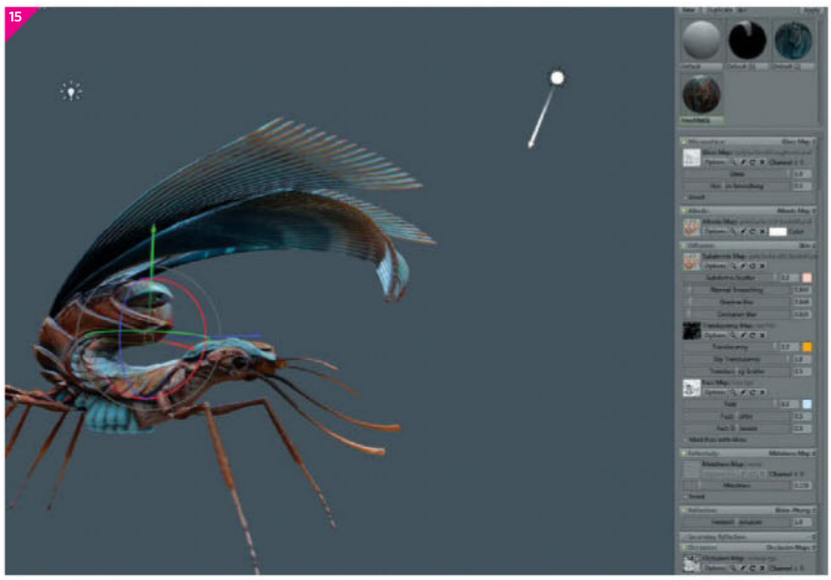

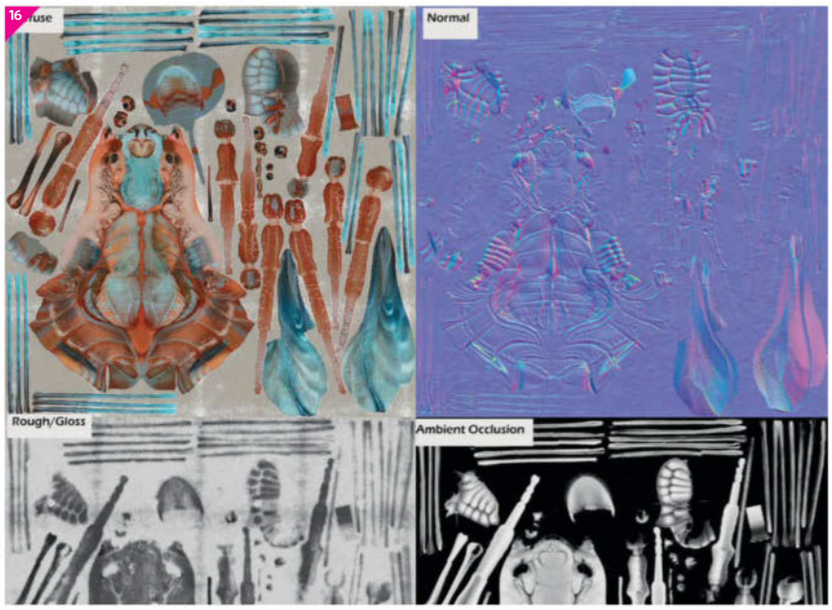

Elements of good painting and image making

In order to make good images, it is always a good idea to look back at the old masters and understand what techniques they used to make their work. New masters like Anthony Jones are a great source as well. When looking at a painting done by John Singer Sargent or Velázquez, they have their subjects blend into the background and focus the most detail and lighting variety on the features of the face or place in the painting they want the viewer to focus.

13 Texture baking in xNormal and TopoGun For texture baking there are two pieces of software that work brilliantly. xNormal is great for generating the Normal, Color and Cavity maps, while TopoGun creates wonderful AO maps. When using xNormal, Ray Casting Distance should be set to a simple value of 2 for the Frontal and Rear Ray Distance and leave the default value for each map setting. One important thing to capture the Color map is to uncheck the ignore Vertex Color box under the High Definition Meshes tab. For the TopoGun AO map, cage distance on the low-poly mesh – keep it at 10, which usually works to cover all of the high-res mesh but doesn't cause any clipping into the low-res mesh with the ray casting.

14 Create additional maps Additional maps that will be used are the SSS map, Fuzz map and Material ID map. For the SSS map it is easiest to just take the low-res mesh into ZBrush and paint in in black where the SSS should appear on the model. Then just simply create the texture from PolyPaint and invert it to create the final SSS map. For the Fuzz map take the AO map, blur it and invert it to have the fuzz effect appear only on the broad, exposed areas of the model. For the Material ID map, simply take the high-res model in ZBrush and paint with bright bold colours where the different material values would go. An example would be that the eyes and mouth features would be a different material than the body-covering shells. After the colours have been established, bake a Color map from it to get the Material ID map.

15 Set up Marmoset scene and materials For setting up the Marmoset scene, it is a good idea to first bring in the decimated high-poly mesh and low-res mesh with the Normal, Cavity and Occlusion maps applied to ensure the low-poly model looks just as good as the high-res sculpt. For establishing the lighting it is good to start out with an HDR palette that looks best with your model and a single directional light to test the lighting on your model. For the material that's used on the final model, use the Skin setting with a high Subsurface value and the Color map as the Subdermal map. Use very low Normal Smoothing, Shadow and Occlusion Blur. For translucency, use the SSS map and a very low Sky translucency. Use the Fuzz map and a very high Fuzz Occlusion for the fuzz.

16 Use Quixel for texture polishing Bring the low-res mesh, Normal map, AO map, Color map, and Material ID map to create the Quixel project. Once it is created select the Inflamed Monster Skin material and use it as a Soft Light overlay to punch up the colour richness in the Diffuse. Use the

mother of pearl material with no Diffuse and a high Gloss effect to assign to the wet, fleshy part of the model using the Material ID assigning. Then use the Sand Weathering material to break up the Roughness values on the body. One final technique to use is copy the base colour texture and use a Soft Light overlay to enhance the colour vibrancy as well as taking the Cavity map to punch up the sculpted detail in the Diffuse map.

17 Light and render in Marmoset Take the Quixel maps and plug them into the Marmoset material. Once the maps and values have been dialed in, it's time to start getting the scene ready to export into Photoshop. For final lighting it is best to follow the three-point lighting system with one form light, one bounce light and one rim light. Use a spot light to establish the form light and use the HDR environment as the bounce light. Then use a high-intensity directional light for the rim light. Use any additional point light to help punch up the lighting of certain areas of focus on the model.

18 Compose the final image in Photoshop Once the final render is brought into Photoshop it's a good idea to have the background start as a 50% grey value, then use the layer feature to adjust it to have it work in best harmony to the model render. The next step is having the model establish a value/edge value relationship with the background. Use the Gradient tool to have a smooth transfer of the rendered model into the background of the image as well as large, smooth brushes with a low Opacity value.

19 Elements of a good painting and brushwork A good technique to establish painting like found and lost edges in the final image is to use a flattened round brush with an Opacity transfer to lay in strokes that help enhance hard edges and soft edges, as well as punch up colour vibrancy and better value composition in the image. If the Spacing is turned up to a higher value some interesting patterns in the brush work can be generated.

20 Final image pass effects Some final features to be added to the image are the vibrancy, colour balance, and level image features. Always be careful when using these to not be too extreme and crush the values or colour, or the image will end up loking blown out and it'll lose the realistic effect we've been trying so hard to achieve. An effective, simple way to achieve depth of field within the image is to flatten the image to a layer (Cmd/Ctrl+Shift+Opt/Alt+E), then duplicate it and blur it. Then use a layer mask to paint in where the blurred lost edge parts of the image should go. One last thing to play with are the sharpen and artistic filters – one in particular is the paint daubs filter, which simplifies and sharpens the values of the image.

Different rendering packages

Another way to render a model is using ZBrush's rendering system. It is a great way to render high-resolution sculptures using different render passes. In order to have control over the spec/gloss of the image, the best way is to render different passes of the model with different sets of Glossiness and then compile them into Photoshop and use layer masks to paint out where the different gloss values should go.

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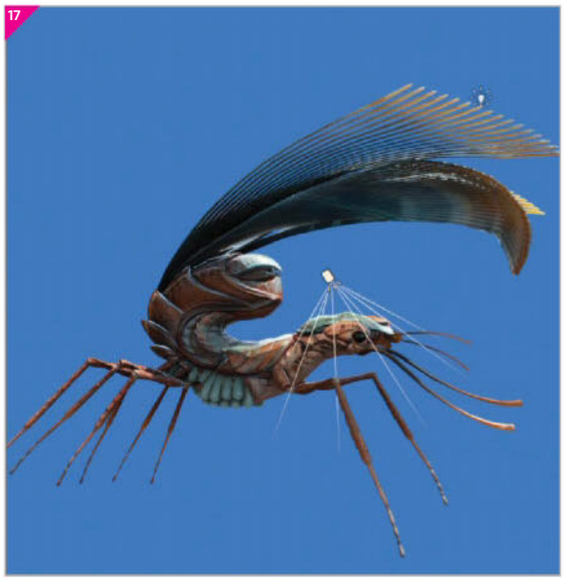

Image isolation render passes

When rendering CG images it's always a good idea to take advantage of the medium and isolate as may elements of the image as possible. A good technique for this is to have every light that affects the model on its own layer in order to have complete control of how much effect it has in Photoshop.

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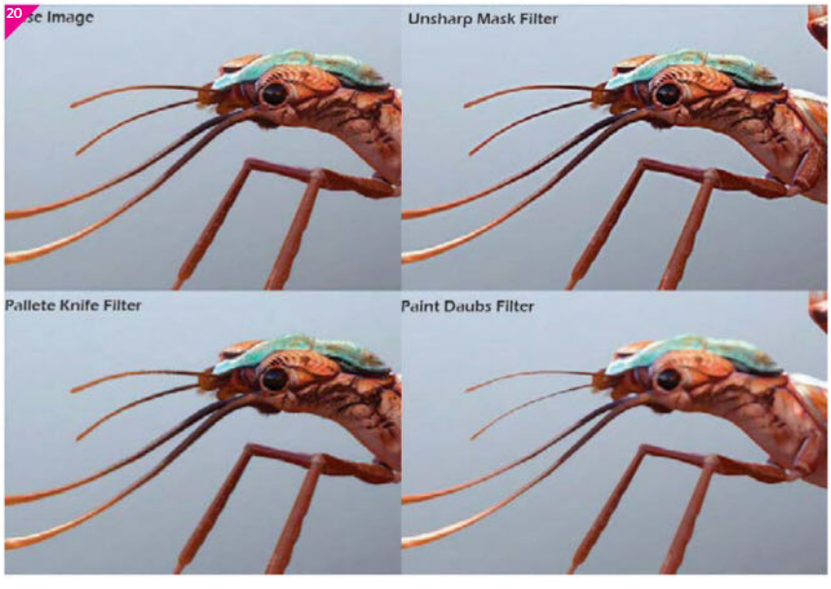

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Coco

JOEL ZAKRISSON
Fishing Trip, 2016

Software

Marmoset Toolbag 2, Maya, ZBrush, Quixel SUITE, Substance Painter, Substance B2M, MakeHuman

Learn how to

- Compose a story in 3D
- Create cute characters
- Make fluffy fur
- Generate believable water
- Build detailed environments
- Enhance the movement of a scene
- Achieve a stylised look

Concept

The style of the diorama is mainly inspired by miniature models, while the setting is based on islands around the North Atlantic Ocean. The composition is made up from my imagination.

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- Maya hotkeys
- Marmoset Viewer URL
- Tutorial screenshots

Build a real-time aquatic diorama

Learn how to create an interesting composition, adorable animals and water in Marmoset Toolbag, while telling a story with your renders

Dioramas are some of the best ways of telling small creative stories, while at the same time showcasing your 3D models. The concentrated space makes for both enjoyable and focused projects, as well as an interesting framing that catches your viewers' attention.

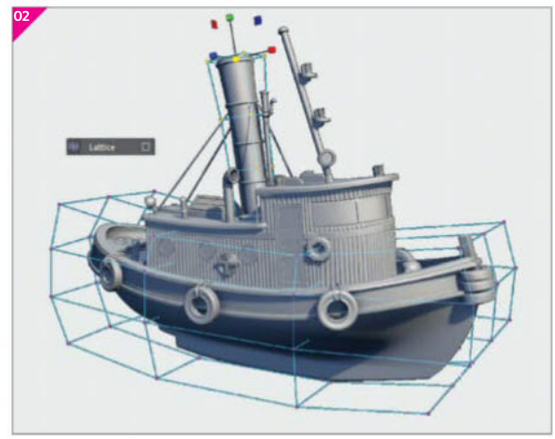
This tutorial demonstrates how to take an aquatic diorama from a rough idea to a complete real-time rendered scene in just 15 steps. We'll go through the thought process behind story-driven scenes, as well as specific techniques to create an interesting diorama. Learn about stylised vehicles in Maya, tessellated water with Substance B2M and the illusion of fluffy fur in Marmoset Toolbag.

The intention is mainly to provide new perspectives on diorama creation, rather than showing all the tiny details of the production. It's therefore assumed that you have some previous experience with 3D modelling for games, but anyone should still be able to follow along.

01 Model a steam tug The steam tug is our main centrepiece and the model we'll be spending most of our time on. Start by modelling a high-poly boat in Maya, following a reference of a real miniature boat as close as you can. Since you're going for a stylised look, it might be a good idea to use rounded edges. Make sure to model all details, from the tiny planks to the deflated tires.

02 Shape a style with Lattice While miniature models have a perfect amount of detail for dioramas, the proportions are realistic. Enhance the charming cartoony look with Maya's Lattice tool by exaggerating the hull's bent shape and by squashing down its length. When done, bake the high-poly model to a UV-mapped low-poly model.

03 Add realistic textures While stylised textures could work, we'll go with more realistic PBR materials. If you keep proportions exaggerated the stylised flavour shouldn't break. The texturing of the boat was originally done with Quixel's DDO tool, while Substance Painter and B2M were used for the scene. Choose whatever you prefer, but Substance Painter appeared to be the faster alternative in this case. Remember to bake Curvature and Ambient Occlusion maps in the programs, since this enables you to generate realistic masks for worn edges, rust, dirt and colour splatter. A useful tip is to base your workflow on masking and to only use brushes for editing masks.



04 Compose a scenario At this stage the scenario is just a rough idea. Story details will appear as we're blocking out the scene with simple shapes in Maya. Think about compositional guidelines when placing objects, aligning them in circles around the boat, which is our focal point. Character interactions are smaller points of interest, leading you from one area to another, always following the steam tug's direction. Analyse your scene from all angles, but especially from where you'd like to take the final shots. Make sure that larger shapes are of similar size to keep the scene balanced.

05 Make a human When you're satisfied with the blockout, you're free to replace it with final models. It's smart to begin with environmental pieces since they're more reusable, but for this project characters were done first. To save time, you can generate a child mesh with MakeHuman – to get stylised proportions – and sculpt cartoon features with some variants of clothes and beards in ZBrush. Create the low-poly with ZRemesher, bind it in Maya with the rig from MakeHuman and pose four characters with different beards and hats. Create two textured versions in Substance Painter.

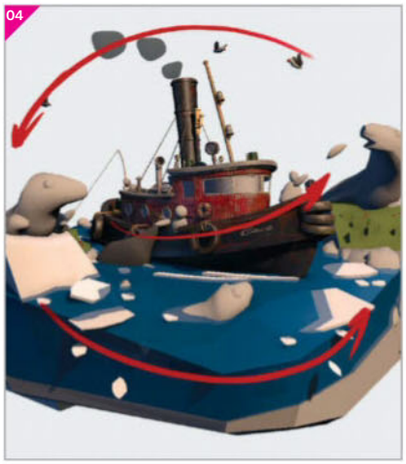
06 Seal pups and fluffy fur When sculpting seals in ZBrush, there's a thin line between that cute cartoon look and something creepy. To enhance cuteness, modify and exaggerate the low-poly's frontal parts with soft selection in Maya (B). After texturing in Substance Painter, you can create a fur material by dividing a tiled wool texture into four different quads with varying degree of Brightness and Alpha. Assign it to four extracted layers wrapping around the seal's body, where the outer layers are the brightest and most transparent. It's an old-school trick used in games like *Shadow Of The Colossus*.

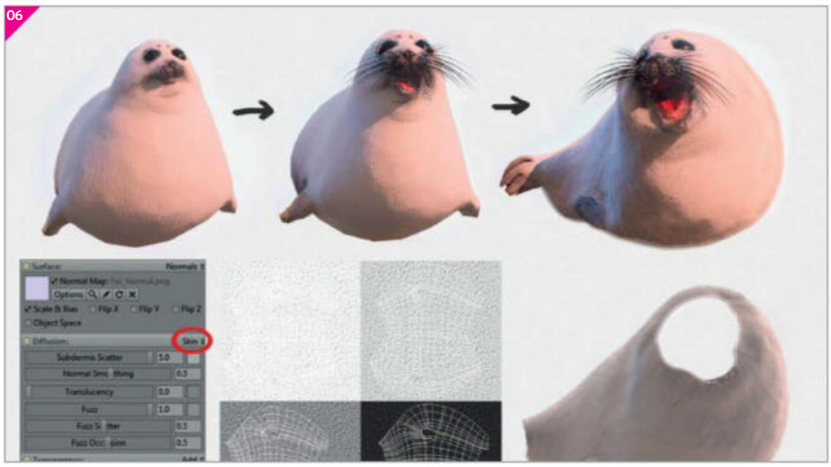
07 Puffin mother and baby birds The puffin mother is also made in ZBrush and baked down to a low-poly model in Maya. To save time, wings are sculpted into the body instead of having actual geometry. Alphas are used for adding feathers, and small planes sharing the same texture give a nice effect of overlapping feathers in the low poly. The bird baby will need a new sculpt, but now with fur layers similar to the seal. For fur and character materials, you should always have Skin selected under Diffusion in Marmoset.

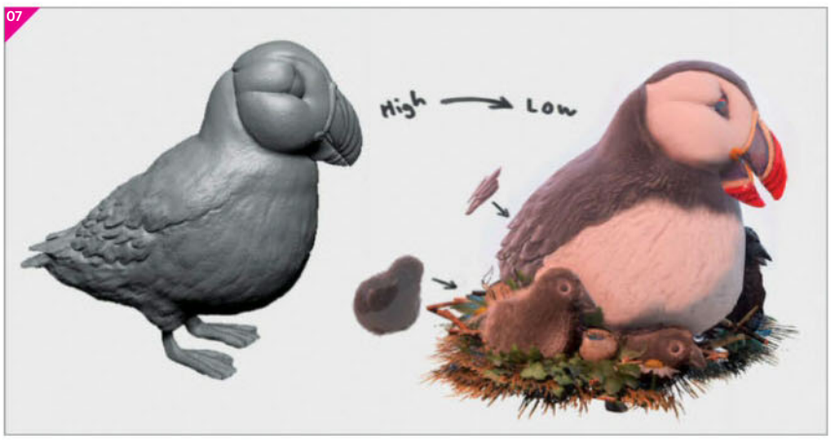
08 Go fishing online Since the fish are quite small, we'll find a quick solution here. Make a texture with a few fish images and trace those with the Create Polygon tool in Maya. Extrude the shape to make it thick like a fish. Match your UVs with the texture, mirror the mesh and merge the vertices. This technique can also be done for other quickly made animals, such as birds at a distance.

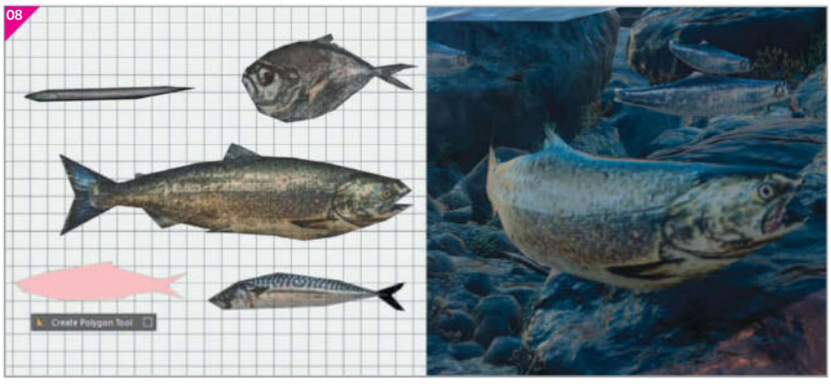
Iterating on narrative

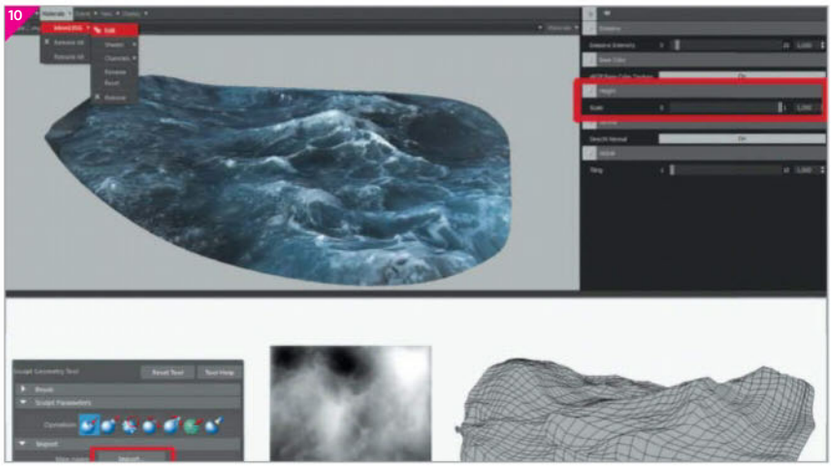
It's important to work from a clear composition, but don't refrain from making changes. *Fishing Trip* initially had realistically scaled animals, but that was changed into tiny fishermen among gigantic seals and a huge puffin. These kinds of changes should be avoided far into production, but small additions like seals stealing fish or biting a man in the foot are always welcome. Characters and humour easily enhance storytelling, which makes you stand out from the crowd.

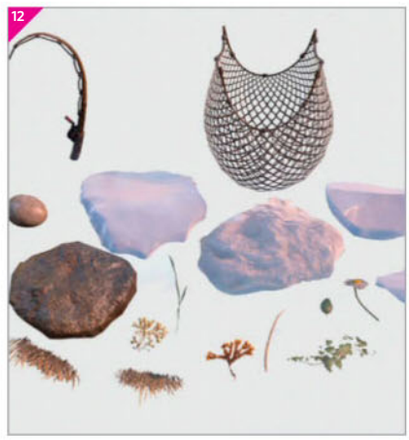












Do it your way

It may be controversial to create characters before the environment, or to start modelling without a plan for the diorama, but it comes down to your preferences. Sometimes these projects feel overwhelming, and it's a good idea to focus on a hero prop like a vehicle before expanding it into something more ambitious. For example, the steam tug was finished a year before production started on the diorama. If you have solid models or potentially great projects lying around, I'd encourage you to pick them up.

09 Add modular rocks It's important to make your rocks reusable, since the whole environment is constructed with them. Sculpt the base with Clay Build Up and Trim Dynamic brushes in ZBrush and make a few unique-looking variations. Use rock Alphas to achieve a realistic rocky surface. Bake the rocks in Maya and use Substance Painter to generate highlighted edges and subtle colour variation. Add a bright dry layer on the top and traces of water at the bottom with wet Roughness and a dark colour. Use the Leaks particle brush for bird droppings.

10 Work above the surface The water takes up almost half of the scene and is tricky but important to get right. Get an Ocean texture and move it into Substance B2M to generate a Height map. Apply the Height map on a plane with the Sculpt Geometry tool in Maya and it'll generate a wave-shaped form. Move the waves to make them fit the boat. The shading may look weird in Marmoset, so try to transfer the flat planes' shading to the tessellated plane with Transfer Attributes, making sure that Vertex Normal is enabled in Maya.

11 Go below the surface To create the water's transparent sides, you can extrude the plane downwards and apply a new material to the faces in Maya. In Marmoset, the material is similar to the top one, which is a Specular material with quite low Gloss and Specular intensity, but with an Anisotropic Secondary Reflection applied. The bottom is a copy, but with Transparency enabled, darker blue colours for Base and Specular, and tweaked Anisotropic settings.

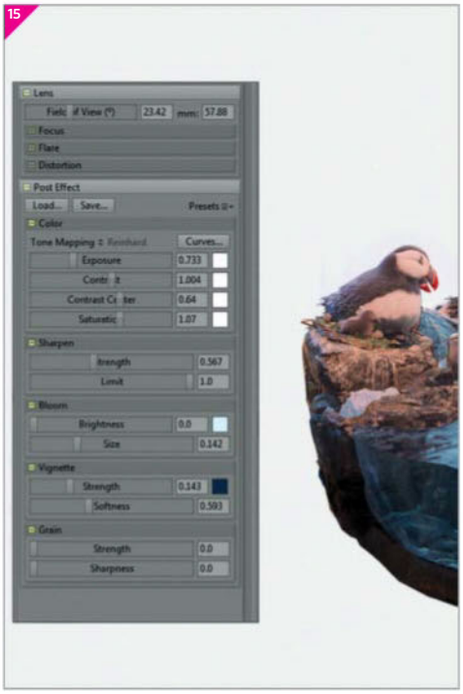
12 Add environmental detail With rocks as our base, we can populate the environment with details such as vegetation, small piles of dirt and snow, and ice sculpted in ZBrush. Materials are quickly generated from textures of dirt and snow with Substance B2M. Vegetation can be made with small planes linked to one texture with several images of leaves, flowers, dead grass and coral for the ocean. Don't forget to model sticks and eggs for the bird's nest, and fishing equipment for the fishermen. Texture it with Substance Painter.

13 Bring it to life through splashes and foam Enhance the energy and life of the scene by adding foam, splashes and snowflakes. Like the water, the foam is a wave picture converted to geometry. Use the water method, but extract the foam's best part from your plane and modify it to match the steam tug's movement. The splashes are transparent textures applied to planes that are placed around the foam. Snowflakes in the air are made in the same way and contribute to the energy of the scene.

14 Create the smoke In games smoke usually consists of several planes being spawned as particles. In Marmoset, however, it's not the most successful recipe due to a few transparency issues. Luckily for us, we can take advantage of the art style and create a stylised cloud instead. Let's combine both the water and fur techniques here. Create a basic cylindrical smoke shape in Maya and experiment with cloud Height maps to get cool-looking shapes. Extract three layers from the mesh and use a duplicated Fur material.

Find your shortcuts

Quality is important, but focus on what matters. Try to find shortcuts wherever you can and avoid doing everything the hard way. You can use MakeHuman for characters, generate water and fish from photos, and if you're working with clothes, Marvelous Designer is highly recommended. For texturing it's always clever to save Smart Materials in Substance Painter so that you're able to re-use the rock materials in future projects. Saving hotkeys for various programs is also a hot tip, since it speeds up your modelling tremendously. If you're interested, you'll find my own hotkeys for Maya included with the article's free downloads.



15 Drop in the final touches When everything works together, it's time for the final touches. Tweak post-processing with Marmoset's camera by slightly increasing Contrast, Saturation, Vignette and Exposure to make the image pop. Take your final transparent renders from chosen camera angles and insert a background with a round-centred gradient in Photoshop. You can make subtle adjustments with the brush, like highlighting focal points in the middle and adding shadow in less important areas such as the bottom. It shouldn't look too different from the scene, if you plan to make a video or Marmoset Viewer file.

Showcase

Joel Zakrisson

While Joel's currently working as a 3D artist at EA DICE, he was recently a student at Future Games in Stockholm, Sweden. Over the course of the year he took on several ambitious and highly detailed projects, all gaining a lot of attention online.

***Mansion Hall*, 2016**
Unreal Engine 4, Maya, ZBrush, Substance Painter, Substance B2M, Marvelous Designer
The atmospheric *Mansion Hall* was an experiment, where a calm warmth meets something eerie in one environment.

***Locomotive Exhibition*, 2016**
Unreal Engine 4, Maya, ZBrush, Substance Painter, Substance B2M, Marvelous Designer, MakeHuman
Joel built an entire exhibition hall to showcase his Bavarian steam locomotive.

***Cog Ship Battle*, 2016**
Marmoset Toolbag 2, Maya, ZBrush, Substance Painter, Substance B2M, Marvelous Designer
This project started out as a catapult, but turned into an immense battle between a dragon and medieval seafarers.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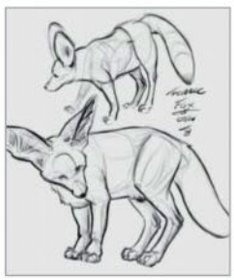
TONY CAMEHL
Fox Écorché, 2016

Software
ZBrush, KeyShot, Photoshop

Learn how to
- Master the muscle system of quadrupeds
- Analyse form and characteristics
- Create your own reference material
- Use your references
- Set up a base mesh of the animal
- Create the final pose
- Use Polygroups for posing
- Sculpt the muscles
- Set up the mesh for rendering
- Use 3D animals for drawing/sketching

Concept
This fox écorché is part of my animal anatomy study that I am doing in my free time. Understanding animal anatomy is a great way to create plausible and more realistic-looking creatures and aliens



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Master animal anatomy

Create a realistic animal écorché to learn more about the muscle system of quadrupeds

Over the next few pages you will learn how to create realistic-looking animals and, most importantly, the underlying muscle system. The following steps will help you understand how to sculpt a fox écorché. Different shapes of the fox will be analysed in detail, and through this you will be able to learn different processes. Aside from that, you will also learn some tips and tricks for how to create professional-looking final images.

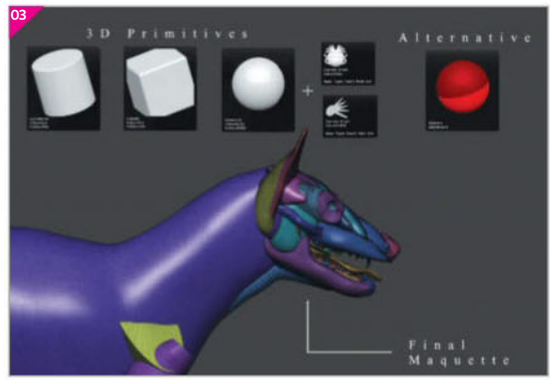
The software that was used to create the écorché is ZBrush by Pixologic, but you can also use Mudbox or any other sculpting software available to you. One of the reasons for learning animal anatomy is to be able to not only create realistic-looking animals, but to use the gathered knowledge and transfer it into your own creature designs such as aliens, mythical creatures and so on.

01 Do your research Before we can start modelling the fox we first have to do our research. You might feel like you want to open ZBrush and start sculpting right away, but it is very important to understand the subject you are trying to re-create in 3D. In this case it is important to start by finding videos or photos of foxes and to learn how they behave in their natural habitat. Try to analyse the animal's shape, the characteristics of its movement, the interaction with other members of the same species and how the animal interacts with its surroundings. It is always a good idea to start collecting your own reference photos – and most importantly videos so you can see how the muscles function.

Pro tip: it is always helpful to have lots of reference material available on your second screen. To keep your reference images organised, you can use the free software called Kuadro from Kruel Games.

02 Create your own reference material After you have developed a good understanding of the animals you're trying to sculpt and study in 3D, open ZBrush or any other 3D modelling package and create your own reference material. You'll wonder why we should create our own reference material, but it's because we are studying the anatomy of the fox and we want to learn as much as we can about the fox and its underlying structure. Doing this extra work will save you a lot of time once you finally start doing the actual posed fox écorché sculpt.

03 Build the maquette After we have talked about the importance of reference material and getting to know the subject that you are going to re-create in 3D, it is finally time to start building the fox maquette and the reference material that we will use later on. There are two ways of creating your fox maquette. The first method is using the ZSphere tool, while the second option is using normal 3D primitives like a cylinder or cube. In this tutorial we are going with the 3D primitives with which we are able to manipulate in order to get an almost fox-like base mesh.



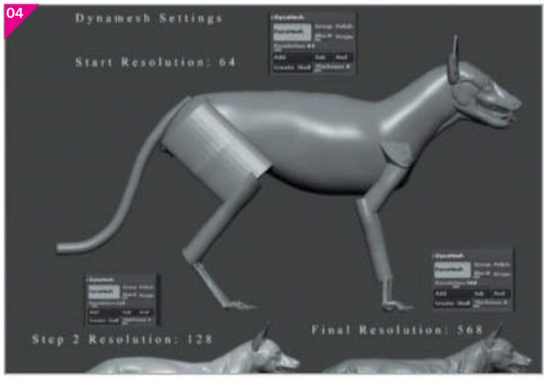
Think about the final result

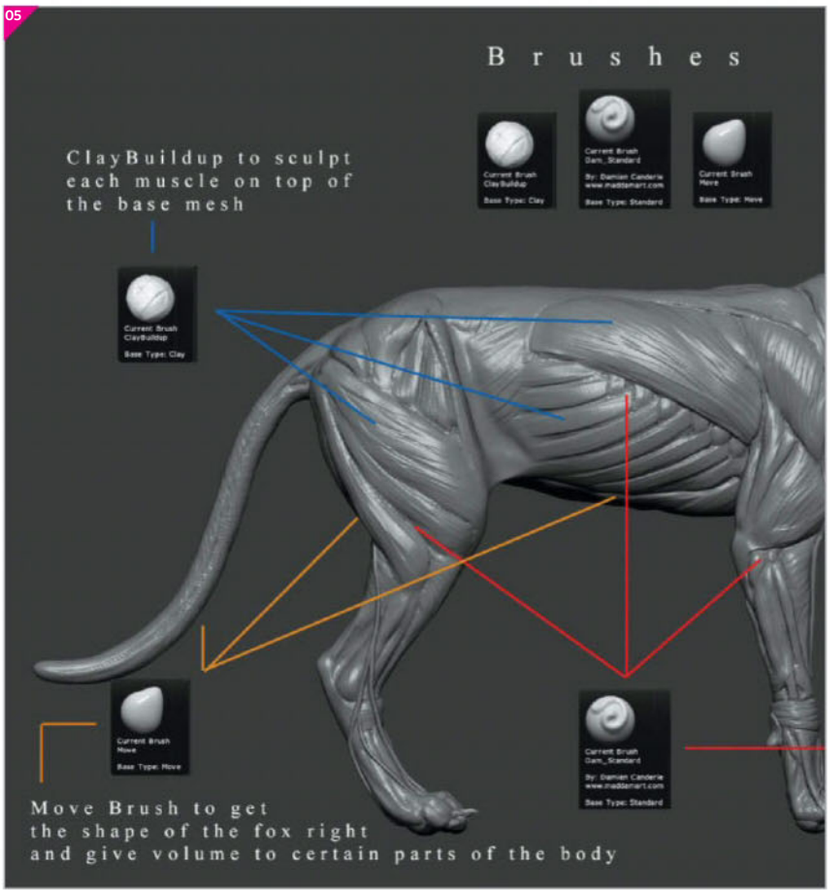
While you create your standard T-pose fox maquette, it is also a good idea to keep the mouth ever so slightly open. It is definitely worth the time to do this extra work because once you start posing your fox character in a more dynamic pose, you'll have the freedom to decide whether you would like to close or widen the mouth. Another important step that I like to cover in this phase of building a fox maquette is to work in Symmetry mode. As soon as you have finished creating the maquette you can use it as a base mesh to start posing the fox without using the Symmetry mode, but still have the accurate proportions of the fox.

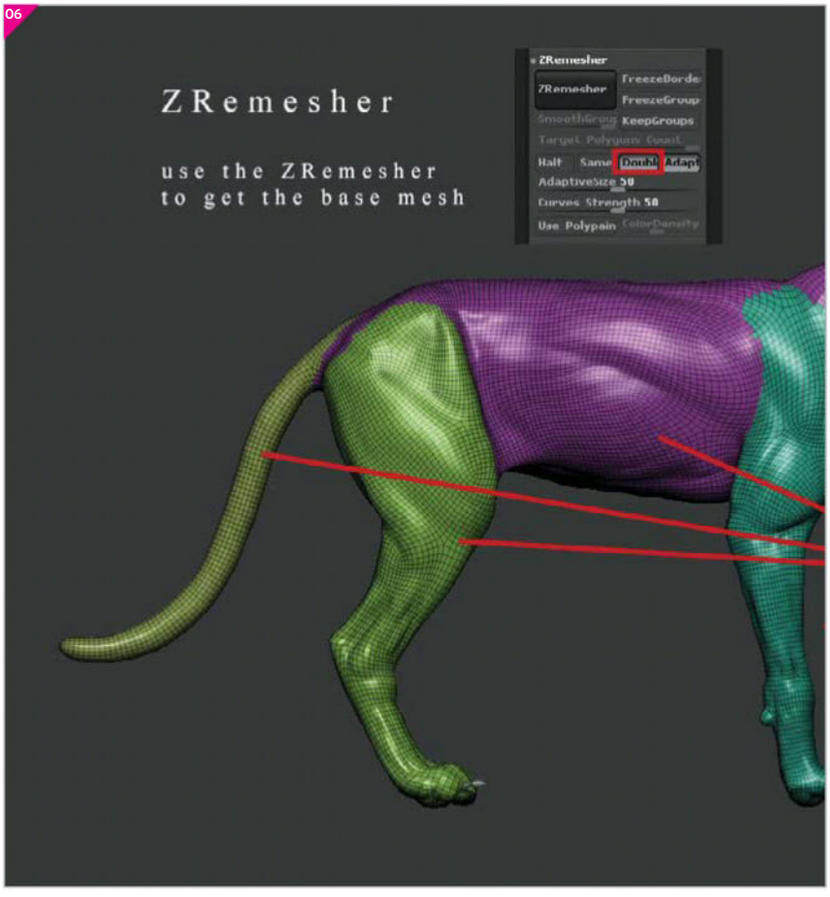
04 Work in DynaMesh mode As soon as we finish building our fox maquette we can start working in DynaMesh. For this step keep in mind that the claws, the eyes, the ears and the inner mouth are separate SubTools, so you don't want to merge them together while using DynaMesh. But before we can start sculpting, we have to know how to use the DynaMesh tool in a proper way. By starting with a low resolution (64) it is easier to block out the main muscle shapes. After this step we can increase the resolution up to 128 and start adding some finer details and refining each muscle. The final resolution of 568 is great to add even more detail and make the model look more realistic.

05 Pick your brushes We are going with just three main brushes to get a decent-looking fox écorché, and all of the brushes we'll use come with ZBrush. The first one is the Move brush, which helps you to get the correct volume and the characteristic shapes by moving the digital clay. The second brush is the ClayBuildup to actually sculpt in the different muscle groups – alternatively you can use the ClayTubes brush. The last one is the Dam_Standard brush to separate the muscles from each other and cut in some areas.

06 Base mesh for posing After our T-Pose muscle study is finished, we are going to decimate the T-Pose fox écorché by using 20% decimation. After that we can use the ZBrush to KeyShot Bridge tool and jump into KeyShot to render out different angles of the fox so we can use these as our reference for the posed écorché study. The second step is to use the original model (not the decimated one) and use the ZRemesher tool to get a nice topology flow. Now we can use the MaskPen tool and mask out the main areas we want to keep as separate Polygroups.







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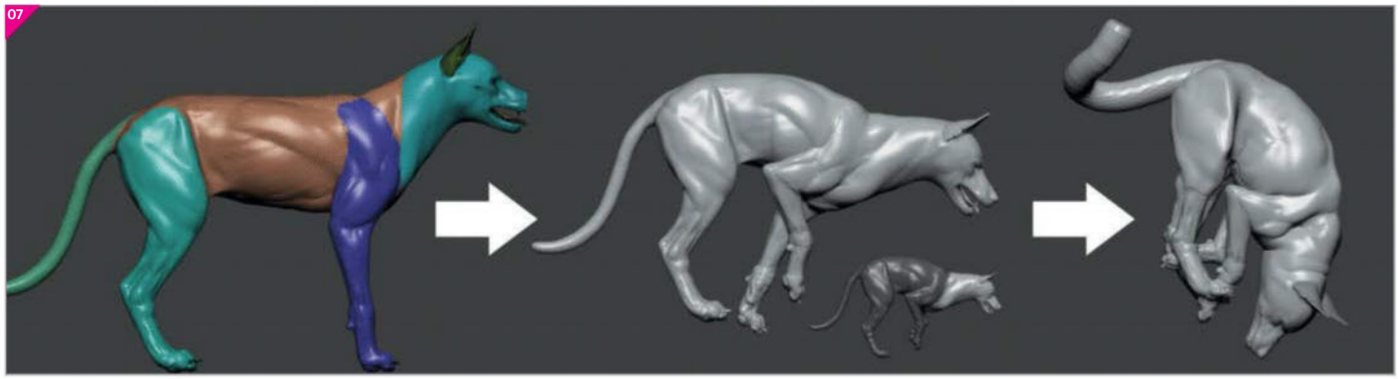

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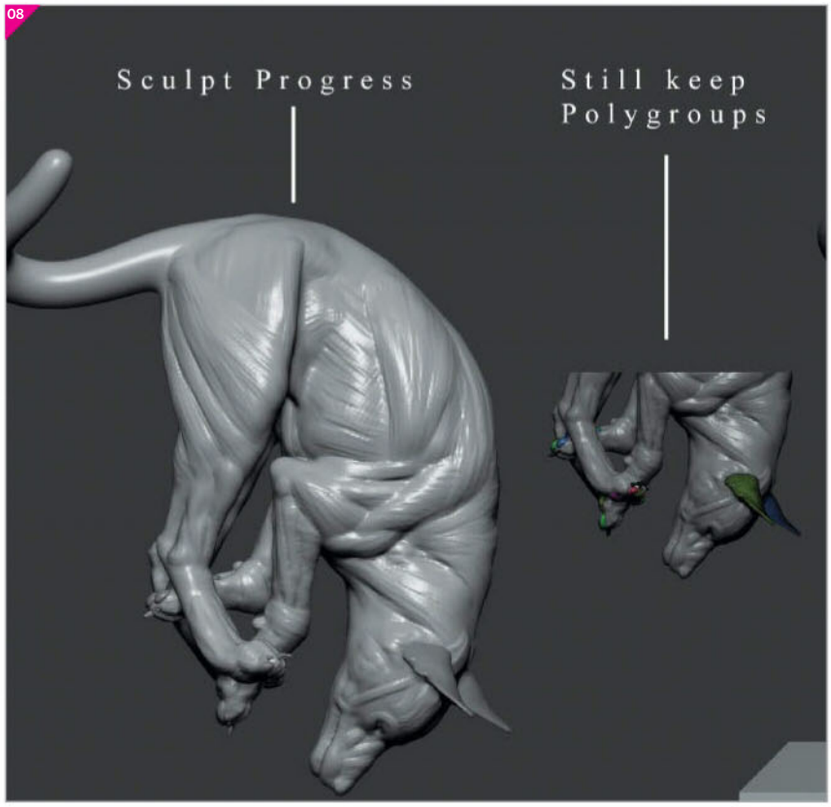

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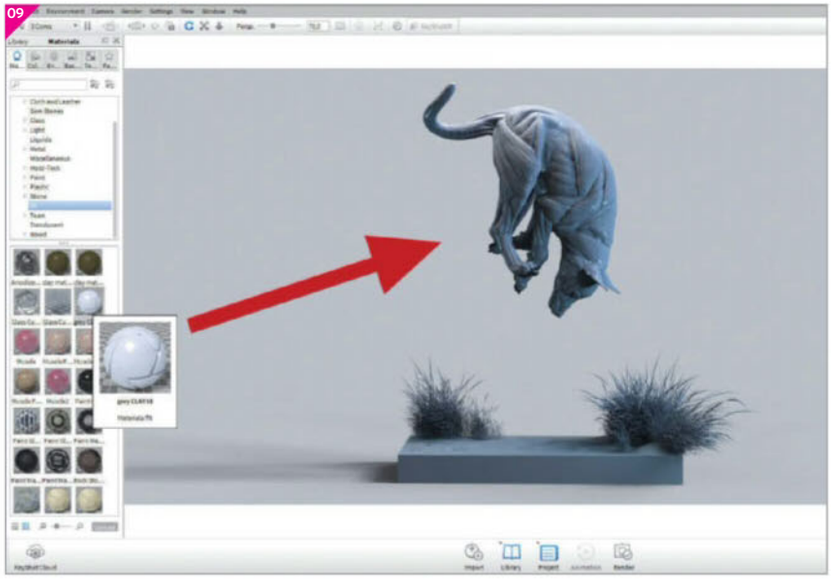


> "Now we can use the base mesh with its Polygroups applied to pose the fox the way we want by using the Mask and Transpose tool"

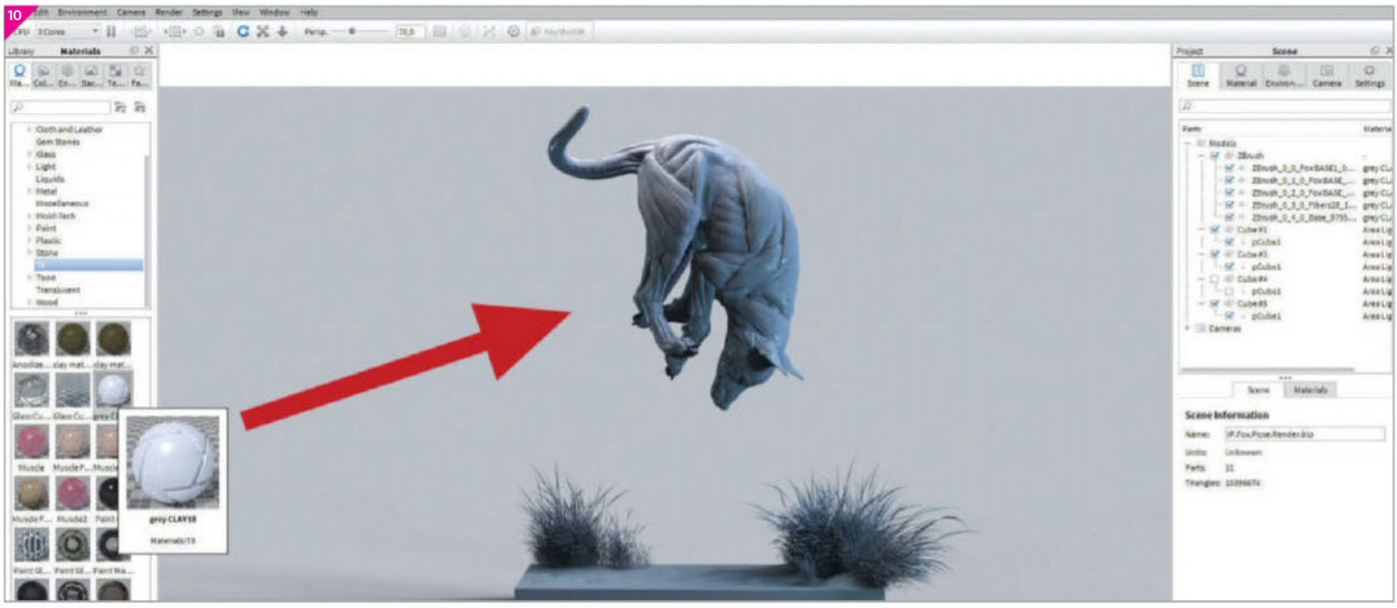
07 Time for some action So far we have created our own reference material and the base mesh for our final action-posed fox écorché. Now we can use the base mesh with its Polygroups applied to pose the fox the way we want by using the Mask and Transpose tool. In this tutorial we will use one of our reference images of a fox hunting in the snow to get a clear idea of how to pose the base mesh of our fox. In order to pose the fox, you can alternatively use the TPoseMesh tool, which is tucked away in ZBrush.

08 Use what you've already learned Once we have finished posing our fox we can start sculpting the muscles. Now it's easier to sculpt each muscle because we already did the hard work beforehand and learned the shapes and volume of the muscles based on the T-posed fox study we did at the beginning of this tutorial. The only difference now is that we aren't able to sculpt in Symmetry mode anymore, but that is no problem – after all, we don't want to limit ourselves by only using tools like Symmetry.

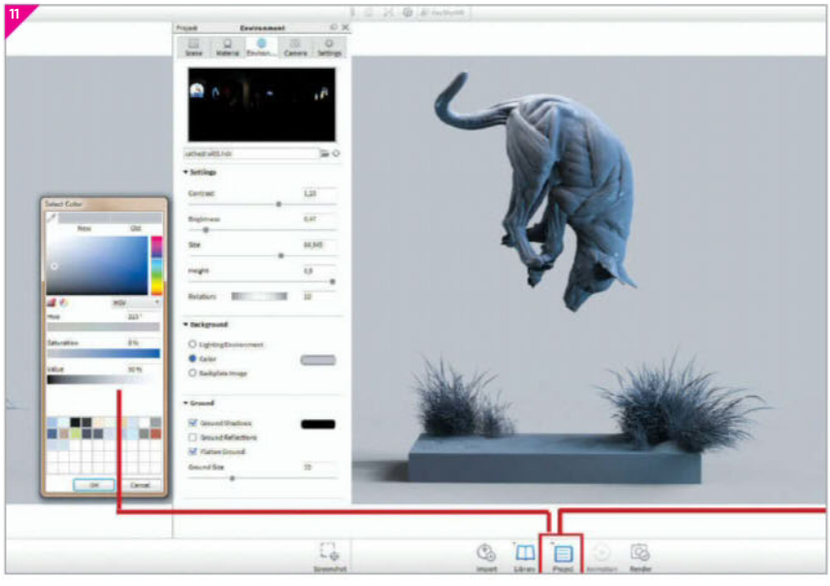
09 Speed up your workflow Even for a personal project or a study like we're doing in this tutorial, you always have to work efficiently, which means you have to speed up your workflow and get the most out of the software that you are using. To do so, I would like to mention the importance of creating your own UI in ZBrush. With this function you can create your own menu that's packed with all the brushes you are using, as well as materials and so on. This will help you work faster and more efficiently.

Take it back to basics

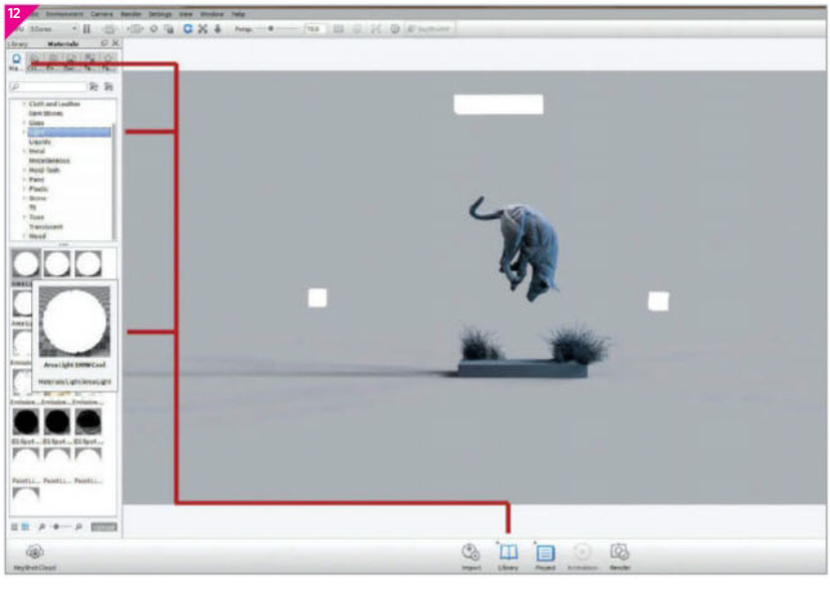
Sculpting muscles can be tricky and overwhelming the first time you try to create your own écorché. There is a trick you can do by analysing and sculpting the big shapes first before going in and adding detail to each single muscle. For example, the shape of the tricep looks like a triangle, while the overall shape of the back leg looks like a rectangle and so on. Thinking about primitive shapes at the beginning is easier, instead of trying to sculpt the trapezius or the gluteus maximus correctly.



10 Render time Finally we are done with sculpting the muscles, so we can use the Decimation Master again and lower the amount of polygons. After that, we can load our final model into KeyShot by using the ZBrush to KeyShot Bridge tool. Once we are in KeyShot we have to add some materials to our model. You can use existing ones or create your own – the choice is yours.



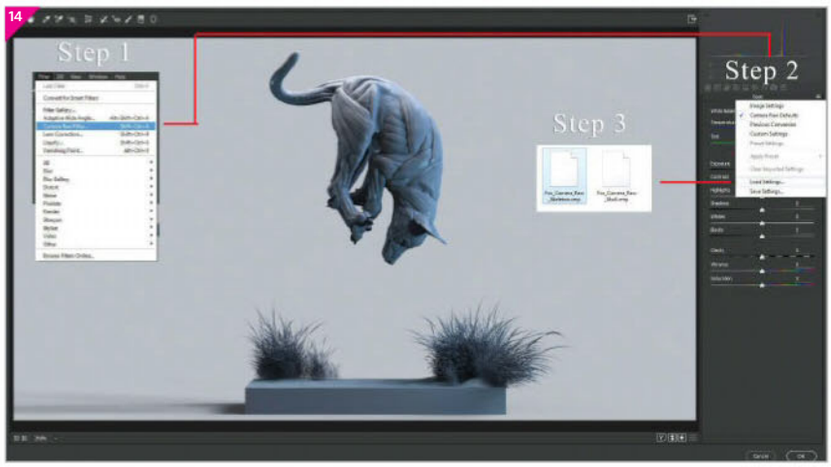
11 Change the HDRI and background Whenever you open KeyShot it loads in an HDRI background by default, and that is not what we want for a final beauty render of our fox écorché. In order to change that, go to Library>Environments and pick up an HDRI that has almost no light information in it. You can also use the ALL BLACK HDRI that comes with KeyShot. After we have loaded our new HDRI, go to Project>Environments>Background Tab and change it from Lighting Environment to Color. Now you can use any colour for your background.



12 Create your own light When rendering in KeyShot, it's important to set up your own light source to achieve a better end result. By doing so you can change the settings of the HDRI under the Environment menu. Lower the Brightness and increase the Contrast so that the HDRI is almost black. Now we can start adding our own light sources under Edit>Add Geometry>Cube. To tell KeyShot that the added cubes have to be a light source, go to Library>Material>Light Tab and choose the Area Light material.

The power of 2D

In this tutorial you're learning how to create your own fox écorché and the muscles of the fox. We've chosen 3D to study animal anatomy, but don't forget about 2D. Great artists are able to work in both mediums, so give it a try and do some skeleton and muscle drawings of the animal you are currently studying. You can also print out some reference images and draw on top of those. Gradually you will get better and be able to transfer your knowledge from 2D to 3D and back.



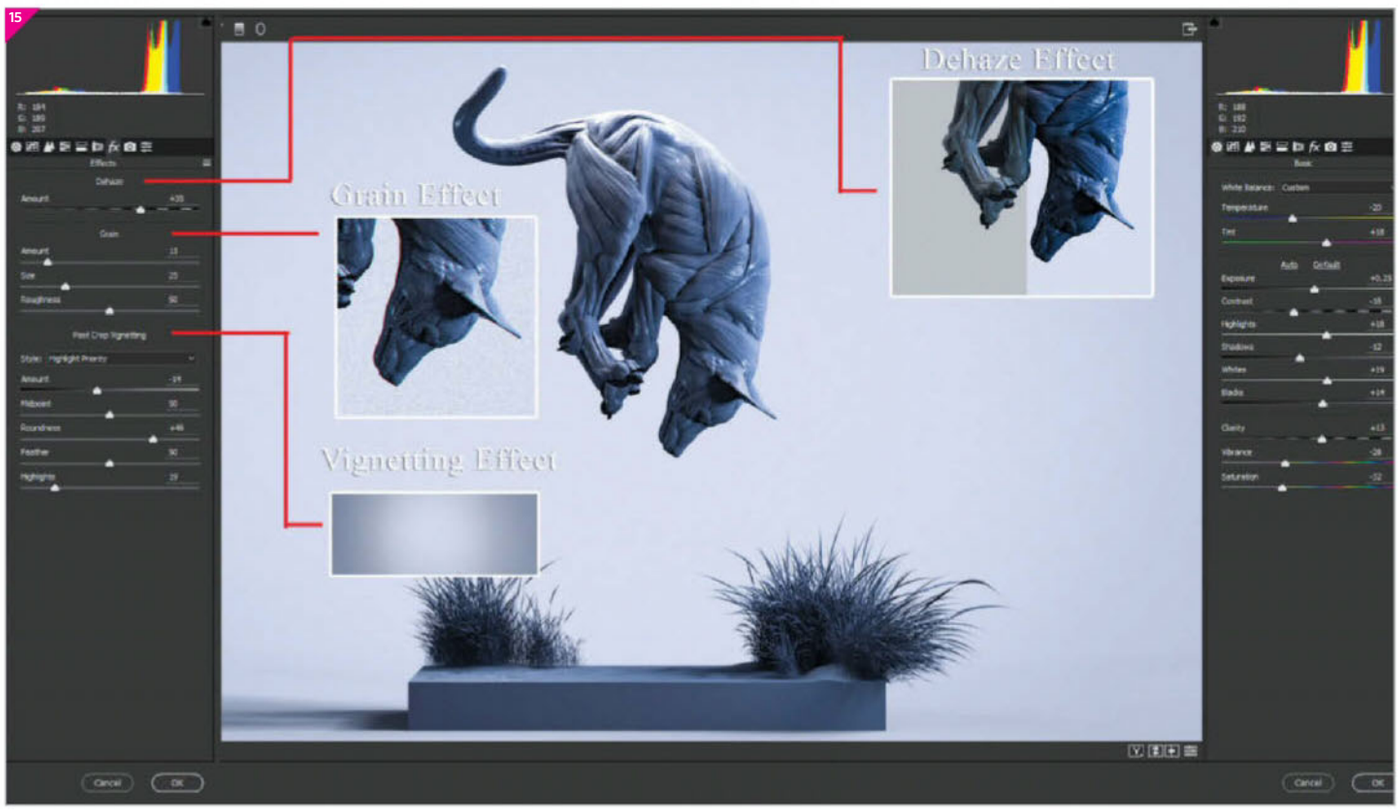
The skeleton system

You've already got a good inside view of how to create this kind of 3D animal study. Another tip that didn't fit into this tutorial about studying the muscles of the fox is to first study the skeleton structure of the fox. You should try and do the skeleton study both in 2D and 3D in different angles. This extra work will give you a better understanding of what a quadrupedal animal has to look like. By knowing the skeleton system, it will be easier for you to start building your maquette on top of the skeleton by using the 3D primitives.

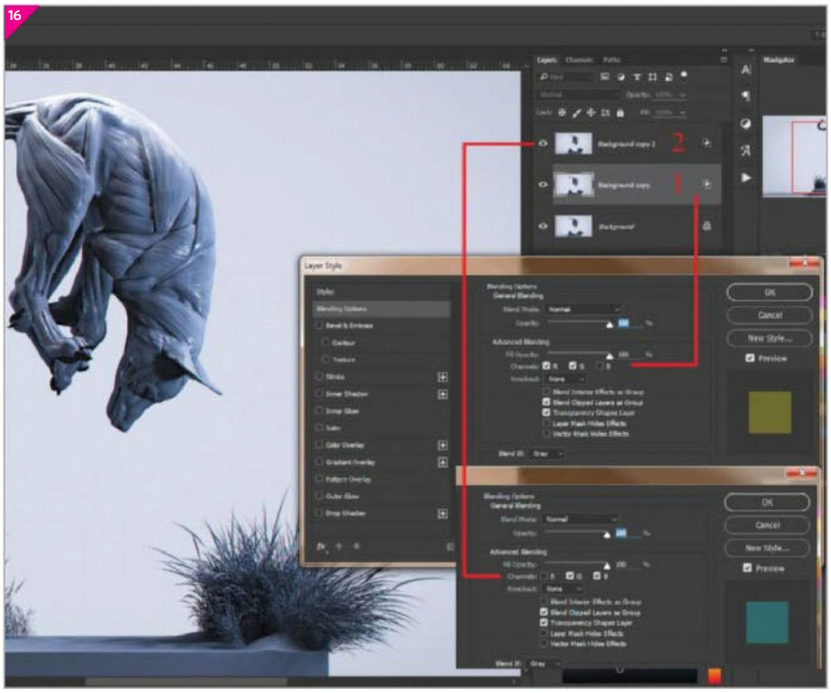
13 **Post-process in Photoshop** We'll use Photoshop CC to beautify our renders because – if we're honest – there is still something missing when you look at the raw KeyShot renders. If you don't have Photoshop available you can also use any other photo-editing software, such as GIMP, Photoshop Elements or Corel PaintShop Pro.

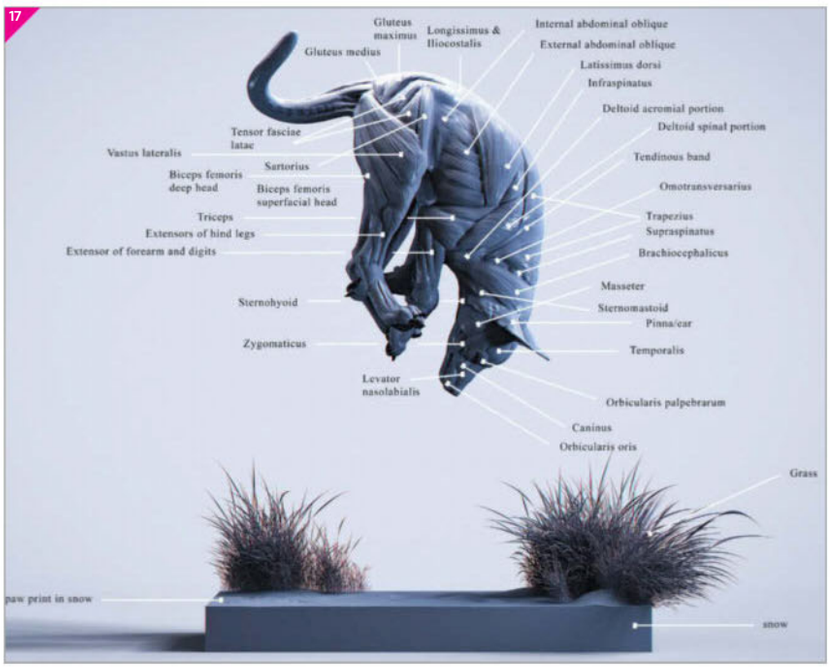
14 **Load the Camera Raw filter** To get a professional-looking final image, open up the Filter menu in Photoshop and access the Camera Raw Filter. A new window will pop up and you can start adjusting the sliders on the right-hand side. If you have already worked with the Camera Raw Filter, you'll know that you can save and load existing files for future animal studies.

15 **Make adjustments in Camera Raw** If you don't have an existing Camera Raw file you can change the sliders on the right to adjust the image by decreasing or increasing the Temperature, Exposure and so on. This will give you some means of beautifying your raw render.



16 Add a chromatic aberration effect Another step to create the illusion that the rendered image was taken by a real-life camera is to add a slight chromatic aberration effect to the image. Duplicate the final render twice and double-click on the first copy to access the Layer Style window. Here, switch off the blue channel under Advanced Blending options. You'll need to do the same with the second copy, but this time switching off the red channel. Now use the Move tool and slightly move the red channel image to the right. If you zoom in tightly then you will see the chromatic aberration effect.





17 One extra step As you already realised, this tutorial is all about learning the anatomy of a fox and, of course, we already know how the muscles look. We also recognise some major muscle groups, but do you also know where the sartorius is located or what the zygomaticus looks like? In this last phase it is a good idea to take your work one step further and create a labelled version of your fox écorché to remid yourself of all the muscle names. I hope you had fun with this tutorial and that you learned something new.

Showcase

Tony Camehl

Since I was a kid I've always been interested in creatures. I started sketching *Pokémon* monsters and after watching *Star Wars: The Phantom Menace* I became passionate about extraterrestrial creatures. After graduating from school I started teaching myself how to create aliens from outer space.

***Big cat is hunting*, 2016**
ZBrush, KeyShot, Photoshop
This was part of my big cat animal anatomy study I started some months ago. I created a base mesh and after that I started doing muscle studies and 'action pose' studies.

***Learning to swim*, 2016**
ZBrush, KeyShot, Photoshop
Another sculpture from my big cag animal anatomy studies. I tried to figure out how a cat swims and how it uses its front legs and back legs by watching a few videos.

***Deer in the River*, 2016**
ZBrush, KeyShot, Photoshop
At this time I studied the deer and I tried to put my animals in some kind of environment. To me it looks much better to take the time and do a quick environment in 3D.

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corona

MICHAEL CAUCHI
Edward, 2016

Software

Maya, ZBrush, V-Ray

Learn how to

- Understand hair properties
- Properly plan your groom
- Create tube geo in ZBrush
- Convert geometry in guides for hair
- Make hair dynamic
- Understand Maya hair settings
- Render and shade your hair in V-Ray

Concept

Here is an early look-dev test done to secure a place in the BFX competition. This tutorial will show you how I made the final version.

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- Tutorial screenshots
- OBJ files

Get started with grooming in Maya

Uncover how to create stylised hair for characters using Maya, ZBrush and V-Ray

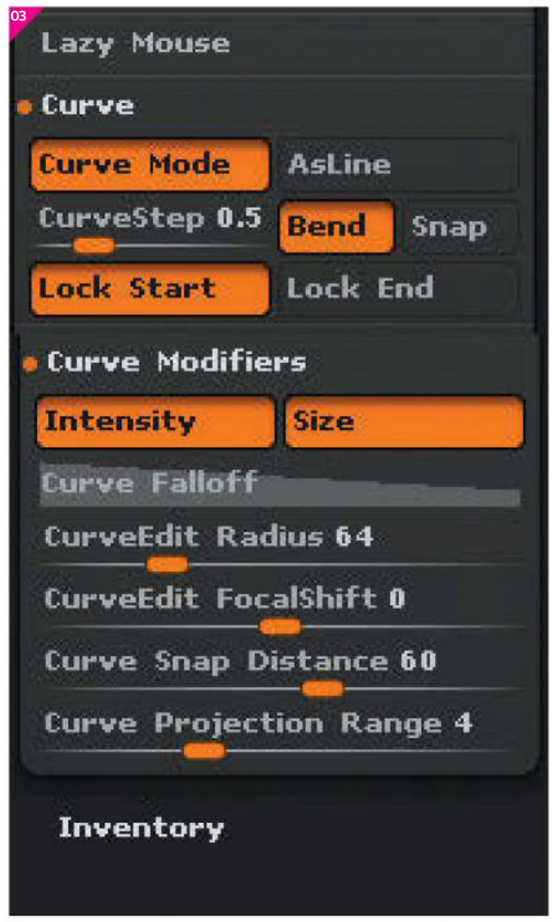
Creating hair for characters in visual effects and animation is a very important process and I feel the workflow is much easier to understand than people expect – hopefully I will be able to show this to you! In this tutorial we will be going through the process that enables you to create appealing hair for your character projects using ZBrush and Maya, and ending with some V-Ray shading tips as well as general tips for the pipeline.

Supplied on FileSilo will be the head and hair tube OBJ files used during this tutorial, so if you just want to get straight into making hair and don't want to do any modelling you may use those. Finally, if you have any questions feel free to contact me or check out my original hair tutorial, details of which can be found on my website!

01 Understand hair properties There are a few things you should understand about hair before you go trying to create a groom, since everything we do in CG has to be based on reality to some extent, even if it is stylised. It is very much worth doing your own research into hair clumping and strand counts in particular, but here's a quick breakdown. The average head has around 100,000 strands of hair. Clumping is important and also varies in size based on the length of the hair. As a result, the top and front typically have much larger clumps than the back.

02 Plan your groom Looking for reference imagery is the first thing you need to do, like with the rest of everything we do in CG. When it comes to hair, wigs can be helpful to find as they are often advertised with multiple angles. Also, try to sculpt or draw your hairstyle as this will help you understand the flow of the clumps, which is very helpful when placing your first guides. Make sure your base model has good UVs as many workflows require PTEX maps to drive attributes and one of the quirks of Maya is that the UVs of the model are still required to create PTEX.

03 Set up for placing tubes To get started, first load your mesh into ZBrush. As we will be using a tubes-to-groom workflow we will first need to set up our Curve Tubes brush (Shortcut is BCW). To do this we want to open up the Stroke palette and go to your Curve Option boxes and set them to the settings shown in the image below, as this will make for the easiest method for using the Curve Tubes brush.

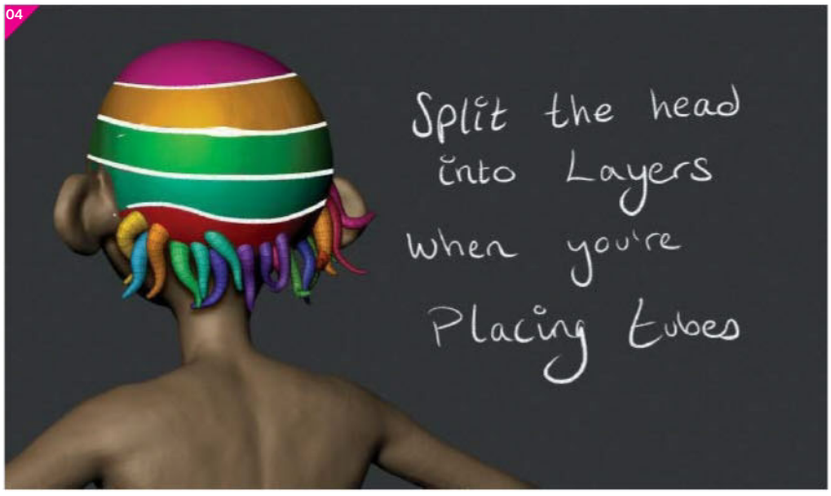


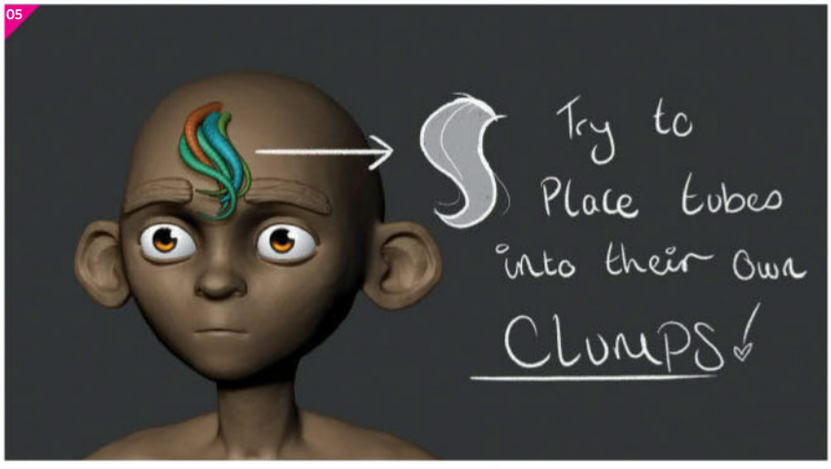
04 Place your first tubes Start by placing tubes at the base of the head and slowly work your way up the head in layers. It is important to work in layers as this ensures that every patch of the scalp has some hair coverage so as to avoid any bald patches. It may also be worth sculpting a proxy hair mesh in order to plan out the flow of your clumps. Also, remember to vary the size of each tube because hair does not clump evenly in real life.

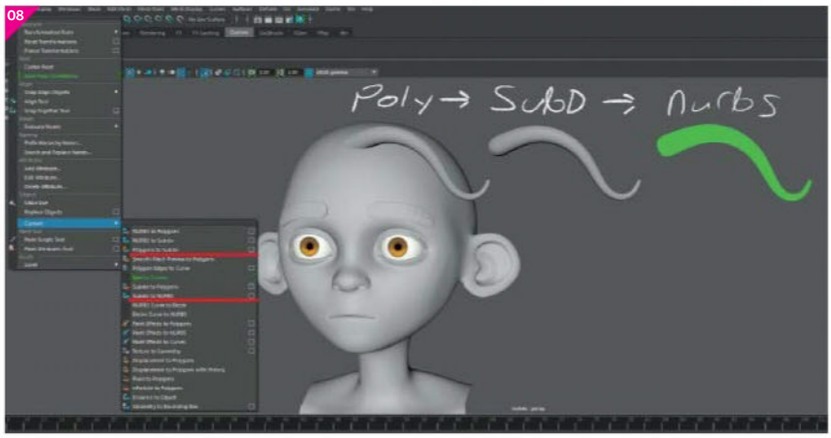
05 Consider the clump hierarchy As you get closer to the top, sides and front of the scalp, try to place your curves with the clump hierarchy in mind. This makes it much easier to imitate the natural hierarchy of form in the hair. As seen in the image for this step, the front flick of hair consists of around eight tubes despite it only being one clump of hair.

06 Check for gaps Once you have placed all your main tubes, hide the head mesh to check if you have covered the whole scalp, as hiding the mesh makes it much easier to see any gaps. After this you can then start placing secondary curves, which can be later used to create stray clumps or just simply to add a little extra variation to the silhouette. After this process you should have something that looks pretty similar to your intended hairstyle.

07 Clean your tube geo Now that we have our tube geometry, export it as an OBJ into Maya so that we can begin converting it into curves for our hair. Before we can do this, however, we will need to make our tubes hollow. To do this you'll have to delete the ends of every curve you made, which would take a long time if it weren't for one simple trick – first, select all of the tubes, go into the Mesh>Cleanup tool and set it to select all quad faces. Once you've done this, you can invert your selection and hit Delete.







> Select all of your curves and then go into the FX shelf and go to nHair>Assign Hair System>New Hair System. We now have a hair system, but as you can see we have a lot of work left to do

08 Convert geo to Nurbs surface Now that all of the tubes are hollow, we can now begin turning them into curves. Firstly, select all of your tubes and then go into the Modify>Convert>Polygon To Subdiv. This will replace your polygon tubes with subdiv tubes. Now select all the subdiv tubes and go Modify>Convert>Subdiv To Nurbs. This process will likely turn your mesh green as the Lambert1 material normally becomes detached after this conversion. If that's the case you can just assign a new material onto the OBJs, but don't worry as we will be discarding these tubes shortly.

09 Convert surfaces to curves There are two methods to convert surfaces to curves. First is by selecting individual isoparms ('edges') on the surfaces and duplicating those into curves – however, this method takes a long time so it's generally recommended to avoid it where possible. The second method to create curves from a Nurbs tube is using XGen, which features some very helpful utilities such as the Surfaces To Curves tool. Simply set it to Curves Start at U=0 to get them to travel along the tube and set the Curve Number to something like two or three and there you go! XGen is standard in versions of Maya from the last few years.

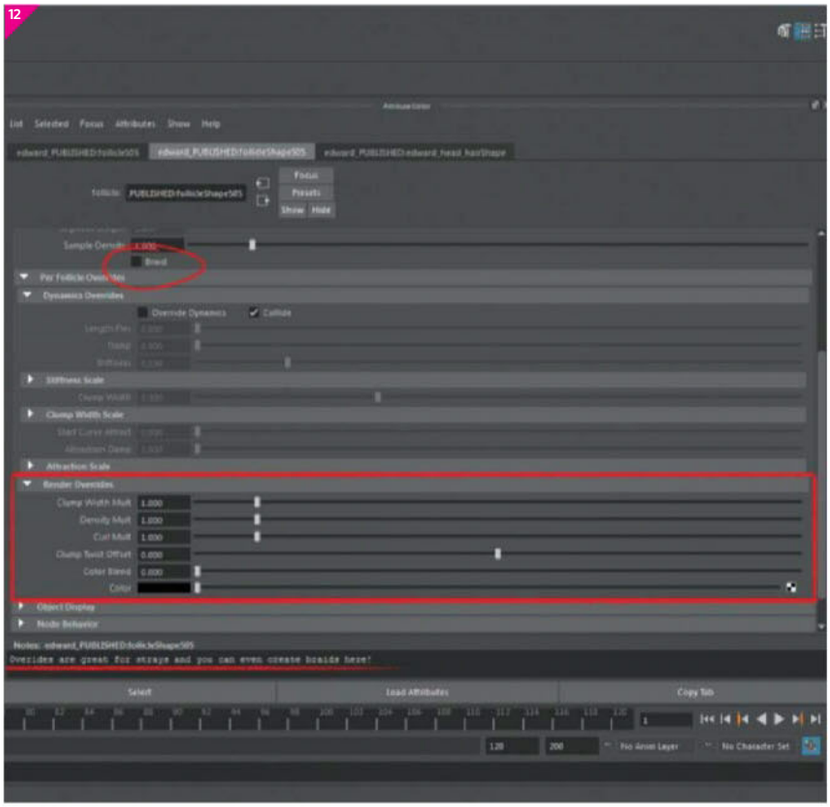
10 Assign your hair system Once all of your curves are correctly set up we can start assigning our hair system. This is a super-simple process in Maya. Simply select all of your curves and then go into the FX shelf and go to nHair>Assign Hair System>New Hair System. We now have a hair system, but as you can see we have a lot of work left to do, so let's get onto the next step.

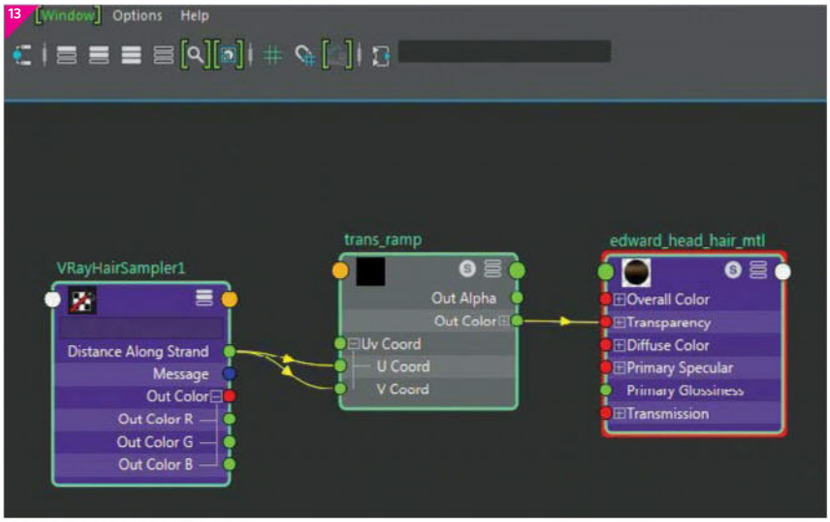
11 Manipulate hair system attributes So we have our default hair and obviously we're going to need to make some adjustments. However, this is way too large of a topic for me to be able to tell you exactly how to make appealing hair – the best way to learn is to simply play about with settings until you find your own way to use them. The most important settings to get you started are: Hairs Per Clump, Sub Segments, Thinning, Clump Width, Clump Interpolation, Curl, Noise and Sub Clumping. To find out what each setting does, check out my website or the online Maya documentation.

Check your CV count

Before you assign a hair system to your guides, it's really important to check the Nurbs CV count. The CV count dictates the quality of the look of your final hair as well as the simulation times. There is no 'correct' CV count to use but, to cut a long story short, if your hair is jagged you'll want to add more CVs, while if it takes too long to simulate, reduce the CV count using the Rebuild Curves tool.

12 Per Follicle Overrides and dynamics When making final tweaks to your groom, it is often necessary to use Per Follicle Overrides, as this allows you to change Density, Curl and other attributes on individual clumps. This is great for things like strays. To make a Follicle Override, select your guide curves and search through the Attribute tabs for FollicleShape. To make hair dynamic, simply select the guide curves we made for the groom and then go into nHair>Make Selected Curves Dynamic. If the tip of the guide snaps to the mesh then don't worry, as you can just go into the Curves menu and select Reverse Direction.





13 V-Ray rendering and shading When rendering make sure check your sample rate. Hair is tricky for AA, so spend time optimising your renders because you'll be doing a lot of these! To assign a shader, select HairSystemShape in the Attribute editor and add the V-Ray attributes. The V-RayHairSampler node allows for more control by giving you attributes, which allow adding natural variance. The most common use is to add a Transparency ramp, making the hair feel softer. Lighting also has a large effect on the appearance of hair, so make sure to look-dev with similar lighting to the final shot.

Showcase

Michael Cauchi

I am currently completing my third year at Bournemouth University's NCCA and am hoping to soon be able to start my career in the animation / visual effects industry.

***Still Life*, (2016)**
Maya, V-Ray, NUKE
A procedural shading and backplate integration project that I did for the NCCA.

***Pretend king*, (2015)**
ZBrush, Maya, V-Ray, Photoshop
This is a little character design that I made for an NCCA project last year.

***Dishonored style study*, (2016)**
ZBrush, Maya, V-Ray, NUKE
I love doing quick sculpts in this style. This one took around five hours from beginning to the final image.

Our experts

The best artists from around the world reveal specific CG techniques

Blender

Paweł Brzustowski
artstation.com/artist/pawelbrzu

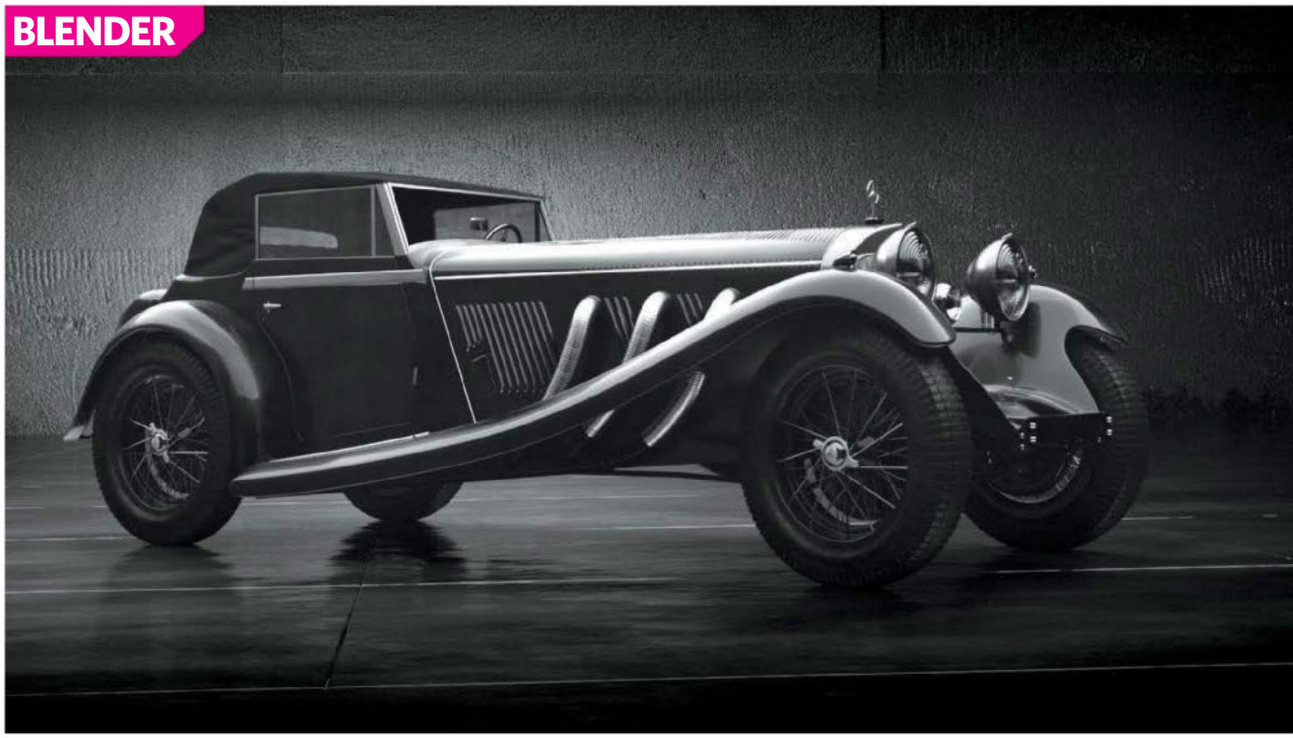
A 3D artist based in Lublin, Poland, Paweł specialises in hard-surface modelling and environments

Clarisse 3.0

Rainer Duda
www.rd-innovations.de

Rainer has over a decade of experience in the visual effects industry. He owns a CG production company

BLENDER



Lighting noir-style vehicle renders

In this tutorial we will focus on car rendering. The idea for our image is in a noir style – but what is noir? The word 'noir' comes from the French language and it means black. Noir is a style that appeared in Forties American gangster movies, among others. Also, it's also proven to be a popular style in German expressionist films, such as *The Cabinet Of Dr Caligari* or *Nosferatu: A Symphony Of Horror*. Characteristic things in noir are strong contrasts between darkness and lightness, night shots of streets covered with dense fog, as well as puddles and wet pavements reflecting street lights. The whole style forms a dark, overwhelming atmosphere. In the following years, elements of the noir style have been used by several movies directors, such as Ridley Scott in *Blade Runner* or Alex Proyas in *Dark City*.

This tutorial is intended to give you a few tips and tricks for the subject of scene settings and compositing. Remember that every car is different and it is impossible to find a universal setting for the stage that would work with all cars. The final effect should depend on what impression you want the viewer to get and which attributes of this object you want to emphasise. I recommend you use not only reference images that depict the kinds of cars you want to show, but also photographs showing photography studios with lighting setups that are utilised for dramatic lighting styles. By watching how photographers set lights in their scenes you can learn a lot.

The whole tutorial will be about Blender and the Blender Node Compositor. We will set the scene and the lights, followed by some necessary post-production.

01 Add a back wall To start off with, we need a car. I will use my model of an old classic Mercedes. Once we have a car we can start to set the scene. One of the most important things that we need to do is to separate the model from the background. In order to achieve this, we will use a simple plane with a wall texture applied. This object will catch the light from the main lamp, so that we can achieve a pale grey background that will contrast with our model. The wall on our stage will have a basic material that consists of three textures: Color, Normal maps and Specular maps. To add a new object click Shift+A and select Mesh>Plane. Hit G on your keyboard to move your object and press R to rotate it.

02 Specular floor To create a floor material, as a base we will use two Glossy shaders (red border). To achieve a more varied reflection, each of the Glossy shaders will have a different Roughness value. Both shaders were plugged into a Mix Shader node and as a factor we'll use Noise Texture. This solution allows us to achieve an unpredictable surface roughness. An alternative method is to use an image texture and plug it into the Roughness input in the Glossy shader. To get different intensities of reflections on the floor, mix your Glossy shaders with a Diffuse shader with a black colour. As factor we use – as before – a Noise Texture or some image texture (yellow border). If we want to scale or rotate our texture, first we need to identify the coordinates that will be used by the texture (green border). This time, use the UV coordinates. We need to unwrap our object – to do this, go to Edit mode (press the Tab key), mark whole faces by pressing A

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- Tutorial screenshots

and then press U and choose Smart UV Project. The next stage is to add a Mapping node, which allows to us complete operations on the texture, such as changing the location, rotation and scaling.

03 HDRI world texture The use of an HDRI environmental texture will give us additional soft light that shines on the car. It will help us bring out the body shell of the model and reduce the blackness of car paint, which otherwise might look like a shapeless black spot.

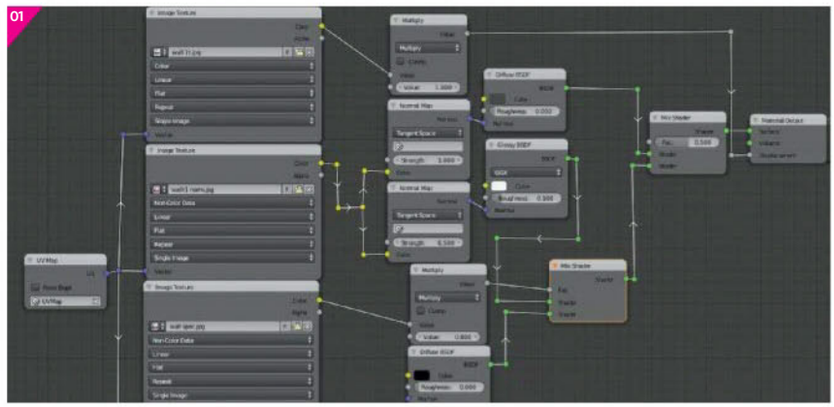
To add an HDRI texture to the world, go to the Node Editor. Select the icon of a globe and click New (red border). Now we need the Environment Texture node, which we'll plug in at the input of the Color Background node. As a source for texture coordinates, we'll use the generated output in the Texture Coordinate node. By using Mapping, set the Node to Textured to obtain a uniformly illuminated profile of the car. With the help of an RBG Curve node, we'll give our texture a slightly blue colour. If you don't want to use an HDRI texture, you can use a mesh plane. Set it so it bounces the main light on the car. With this solution, you can save some memory.

04 Set the main lamp The main role of this light is to highlight the overall shape of the car. Try to set the light to direct the viewer's attention to the main lines that make up the form of the car. You can experiment with the light's position to give character to the object or to highlight its delicacy. On our stage, the main light will be a rectangular plane set along the car. To achieve soft bounces you can use gradients, and in Blender you can easily do it procedurally. Set coordinates on a UV. By using Mapping and ColorRamp nodes, try to set the plane colour so one of the parties is slightly darker. The transition between dark and light colour should be smooth. To be able to control the strength of your light, add the Math node and set it to Multiply, then paste it between the ColorRamp and Emission shader. If you want to turn off the visibility of the lamp, uncheck the Camera box in the Cycles Settings panel (red borders).

05 Add additional lighting Sometimes some of the elements of the car, such as headlights, may require you to add some additional lighting to them. Copy the main lamp (Shift+D), scale it down by pressing S and position it to the front of the element where you want to illuminate it. You have to be careful to not get unwanted reflections of light on the other components of the car.

06 How to avoid overexposed areas Lighting our model will be quite strong, and we will use high contrast, which may result in overexposed places in the render. There are several ways to avoid this. One of the methods is to darken the colour of the Glossy shader until you get the desired reflections. Another possibility is to create the mask, which we'll put on the model. Pick an overexposed element and create a copy of it (Shift+D). Select the top part of the object, press P and select Separate. You will get a new mesh, which will serve as our mask. Remove the element from which you cut the mask, as it's no longer needed. Now you have to slightly rescale the mask by pressing S. It should protrude over the main object. Turn off the shadows cast by the mask (yellow border). Create a new material for the mask. Plug the Transparent shader and Diffuse shader into Mix node. The Factor will be used to darken and brighten our mask.

01



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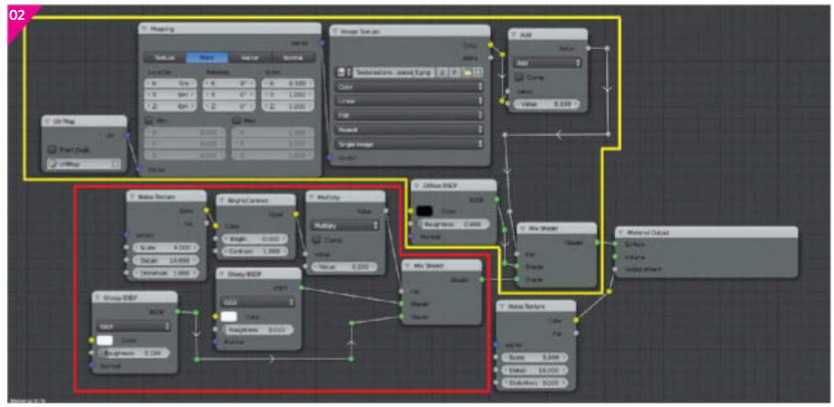

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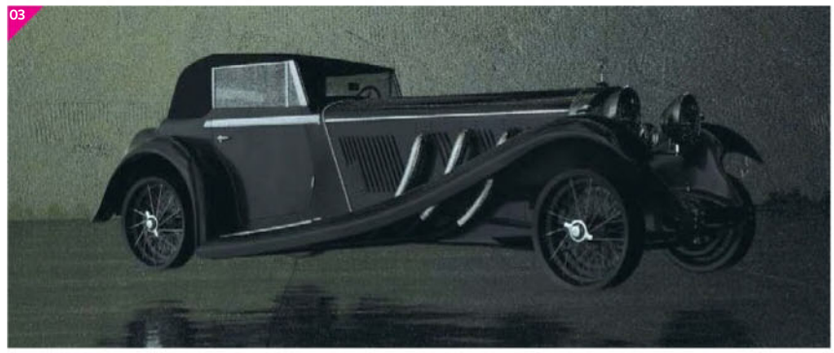

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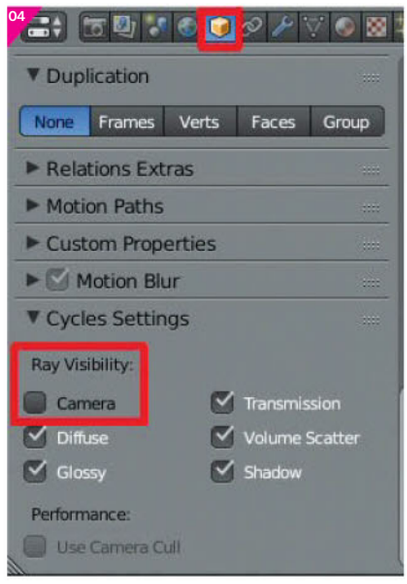

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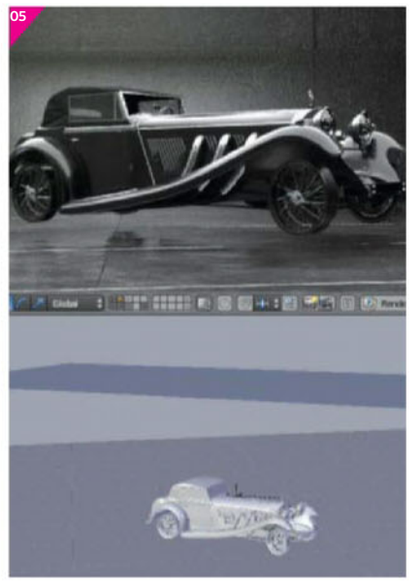
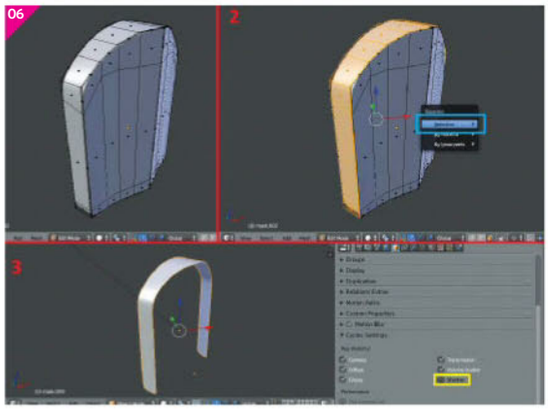
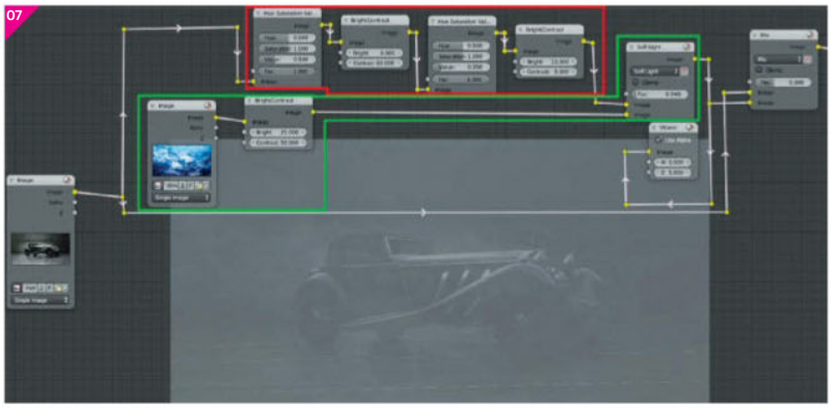


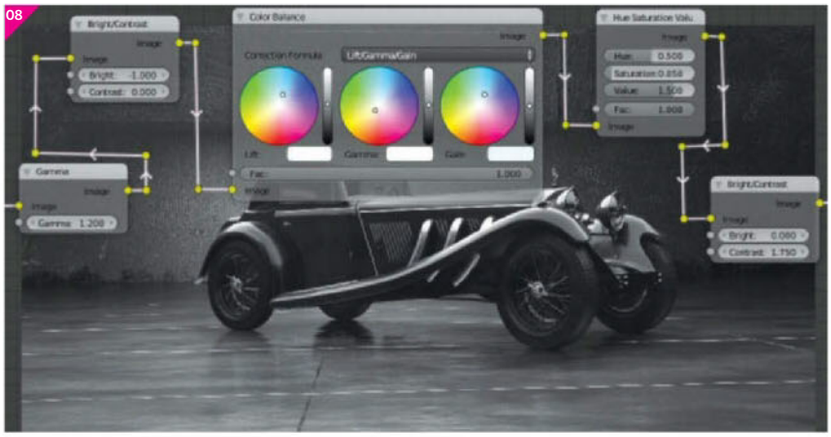
07 Add a haze effect By using pictures of clouds, we will create a filter that gives us a slightly smoky effect. Also, we will lighten the blackness of the car paint. By using the Bright/Contrast and Hue/Saturation/Value nodes, try to adjust the colour of the image to get the effect of a very thick smoke (red border). The image should be quite grey with a barely visible model. Then, by using the Mix node, add a photo of clouds to your filter, trying out different blending modes. In my case, Soft Light gave the best effect (green border). Our filter must be added to the rendered image and here again we will use the Mix node. The Factor value allows you to adjust the effect of the filter on the image. Try mixing other photos with your render – this way you can get some interesting effects, such as stains on the pictures. Remember that the resolution of the images should be the same as the resolution of your render.

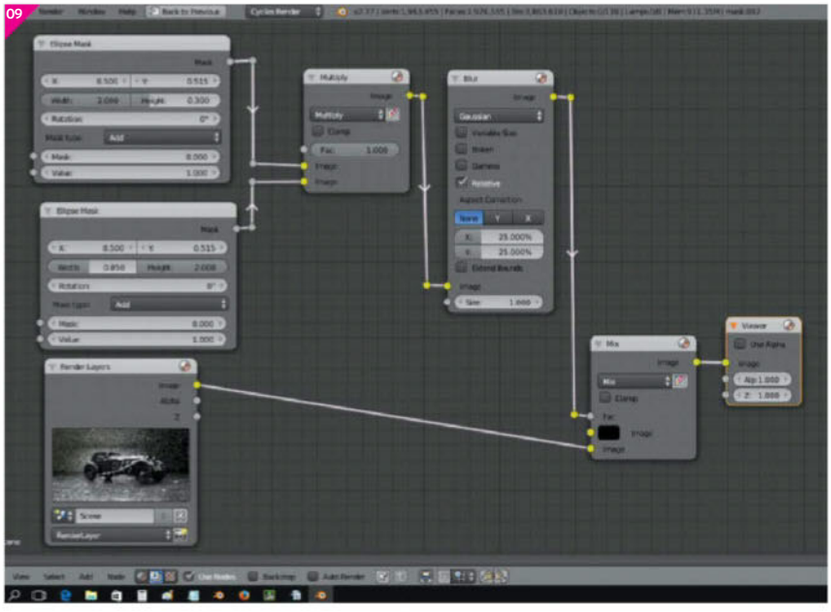
08 Colour correction My standard set of nodes that allow me to achieve a satisfactory image colour are Gamma, Bright/Contrast, Color Balance and Hue Saturation. In the previous section we added a filter that makes our image a little bit too foggy. Using Gamma nodes and Bright/Contrast, try to restore the clarity of render. Increasing the Gamma and reducing Brightness should help, but you can also increase the Contrast. If you increase the contrast of your image and it's still too dark, increase the value in the Hue Saturation Value node – sometimes it gives better results than the use of brightness in the Bright/Contrast node. The Color Balance node is a great way to set a general colour for your image.

09 Add a vignette and Noise texture Too bright a foreground might distract the viewer, so you can darken the edges of the picture by adding a vignette. The simplest vignette can be achieved by adding one Eclipse mask and blurring it with the Blur node. We'll use two of these, which will allow us to make a mask in the shape of a square with rounded sides. Stretch up the first of the Eclipse masks and lengthways the second. To combine them, use the Mix node and set it to Multiply. You need to add a little blur to the finished mask, so use a Blur node. To combine our vignette with the image, add a Mix node, plug the vignette into the Factor Input and the image should be plugged into the bottom input. The upper input controls the colour of vignette, so set it to black. In the end, you can add a little noise, like in old photos. Noise textures can be found online. When you have a noise texture, add this to rendered image in this same way that we did before using a Cloud texture. The amount of noise depends, as I like it when it's only a little noisy, so I set my Mix node to Linear Factor with its value set to 0.005.









Border render

If any part of your render is too noisy, you can render it separately using a rendering in the frame. While in the camera view, click Cmd/Ctrl+B and select the area you want to render. Then, in the Render Options, increase the number of samples. Rendered images can be saved as a PNG file and merged in the Node Compositor with the main image. Rendering in frame also works with live view in the viewport. This can be useful when you want to zoom in only to the selected location. It works faster than the preview without frame.

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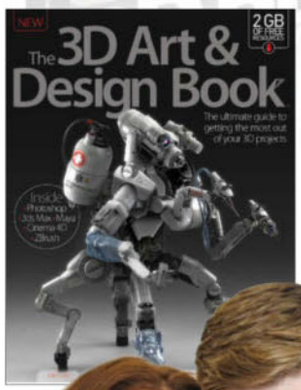

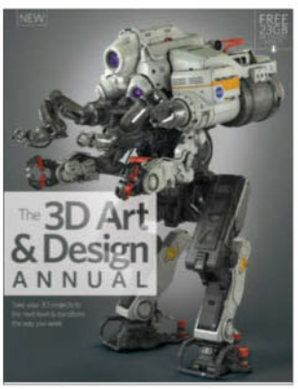

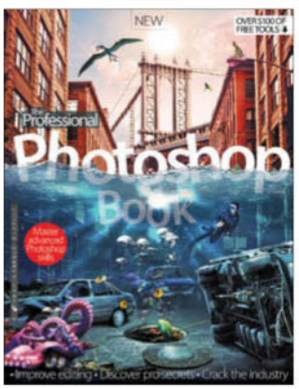

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CLARISSE 3.0

Shade stunning Clarisse environments

Modern production pipelines rely heavily on physically based rendering. PBR render engines often come with special shading and lighting systems. There are some basic concepts to understand when the artist works with PBR materials, especially if you want some sort of realism in your shot combined with artistic touches. The latest version of Clarisse gives artists the freedom and control over the look and feel of complex surfaces without annoying the artist with too much complexity in the UI. This tutorial will dig into essential concepts of physically based material setups and how to set up values for a great compromise between rendering time and visual quality, where visual quality is based on the artistic use of PBR shading.

As a fresh start in a basic shaded scene it is about time to create a new context which will be the material library. Clarisse allows the artist to export contexts as project and reference it back into the corresponding main project. The material library will be the place of action for the tutorial. Here the artist creates a base metal material and derives sub-metal materials with enhancing visual effects based on curvature and Fresnel functions followed by Displacement effects. The artist will learn how easy it is to create PBR materials with the specially developed physical materials and how to combine more of them to create great-looking metals. Next, with the metals it is important to understand how light-emitter effects can be handled with Clarisse's PBR capabilities. The energy cells in the scene need a specially designed energy core, which the artist will create based on Emitter materials. The magnetic core needs a copper/gold-like Rough and Reflective effect, which will be made as well. After the materials are set, it is time to correctly apply them to the corresponding Alembic assets in the main scene.

01 Prepare the workspace At first we'll open the project from FileSilo called Magentic_Start. Afterwards we must create a new context on the Project Level, rename it to Material_Lib and export it as a Clarisse project. To do so, select the Material_Lib, open the File menu, jump to Export and hit the Export As Project function. To start the shader-building process, open the Material_Lib project in a new Clarisse instance. Let's create a simple scene setup to pre-visualise the upcoming surfaces. We need a grid, a sphere followed by a template PBR material, a physically distant light and a Path Tracer object for the 3D layer.

02 Create a base metal material From now on we'll work in the Materials_Lib project. We must import the greasy texture from FileSilo before we create a new PBR

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- Project files

> For the beams we'll add some nice details like procedural stripes by switching to the Material Editor

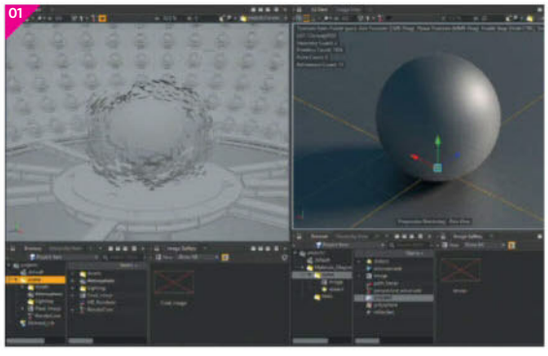
Specular material. The reflection one is a core material, which allows you to create the most setups. Call it Mat_Metal_Bare. In the Shading Attributes we must increase the Roughness up to 45% for a glossy metal look. In the Material Editor, add a Curvature node with a 7% opacity value to the greasy metal texture. That gives the metal layer a nice, worn edges look with darker areas on the inside surfaces.

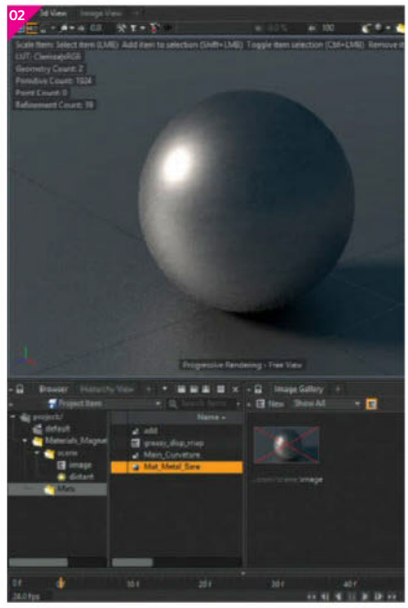
03 Add details via Displacement modifier To give the greasy metal material a more worn out and metal look, besides the Curvature effects we'll want to create a new Displacement object. Call it Disp_Metal_Bare and assign it to the sphere by clicking the texture icon in the Attribute Editor. This is an alternative way to work with attributes and material networks besides the Material Editor window, which is a node graph representation. Additionally we need to assign the greasy texture as an input object with a Displacement Strength of 1.5mm. A Displacement modifier can be assigned through drag and drop or the Material Linker editor window.

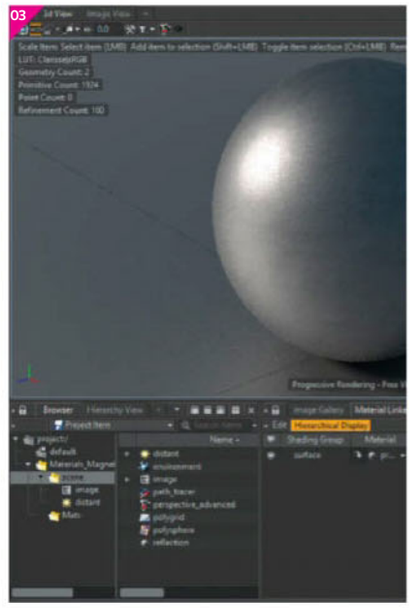
04 Derive metal sub-materials At this stage we need two more greasy metal materials. So we duplicate the Mat_Metal_Bare material twice and name one copy Mat_Metal_Beams and the other one Mat_Metal_Walkway. For the beams material we'll add some nice details like procedural stripes by switching to the Material Editor window. There, we'll create a Fractal Noise and a grid. Both will be multiplied together and the result multiplied with the greasy texture before it goes to the Curvature. The Fractal Node needs

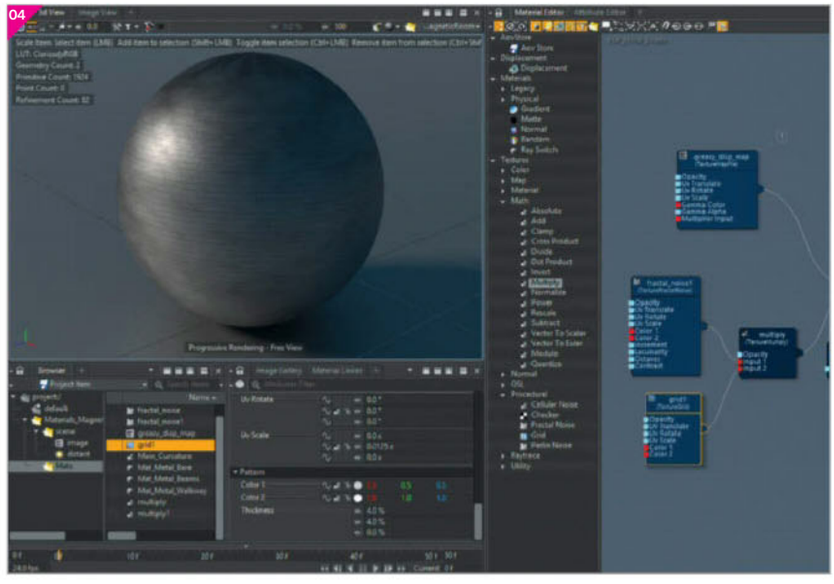
Set up the PBR renderer

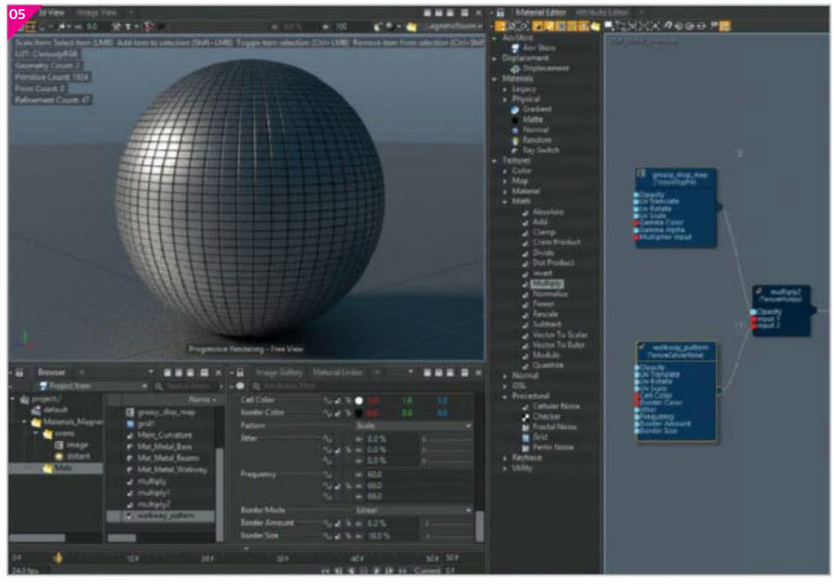
There are a few points to set up before you can render physically based materials. It is really important to follow the physical workflow that is indicated by corresponding menu names. That means setting up meshes, volumes and hair with physically based materials and linked physical lights. Besides the lighting and shading, you must also add the so-called Path Tracer object as renderer in the particular 3D layer. If the project needs a mixture of PBR and legacy components it is recommended to link the respective contexts – physically based and legacy – to their respective 3D layer.











the following attribute changes: UV Scale under UV Transform 0x, 0.0125x, 0x and a Pattern Thickness of 4%, 4%, 0% with slightly lighter pattern colours.

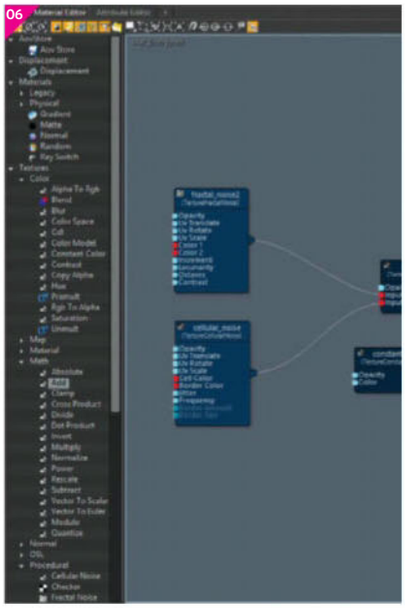
05 Finish the metals We'll work on the Mat_Metal_Walkway material. The target is to create metal dots, which will be displaced and added as colour info. Let's create a Cellular Noise object. Cell colour will be white and border colour black. As a pattern, we'll take Scale and put all Jitters down to 0%. Afterwards, all Frequency Attributes must be at 60 followed by a Linear Border mode, with 8% Border Amount and 10% Border Size. This noise will be multiplied with the greasy texture. Now we can create a new Displacement object and call it Disp_Walkway. For the Input, take the Cellular Noise with a value of 5mm.

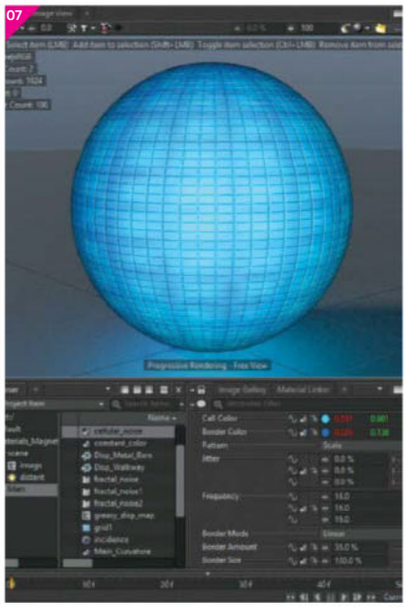
06 Prepare light emitting materials Now we can create a Physical Emitter material and rename it Mat_Energycell. For the main effect, mix different shades of blue together, one near green and another deeper blue color. That result will be the front colour of an Incidence object where the rim colour is a black constant colour to indicate a dirty rim. To start, we'll create an Incidence object next to a constant colour, an Add node as well as two Noise objects, a Fractal and Cellular noise. The Cellular noise will be the light cells where the Fractal Noise will indicate something that resembles moving energy.

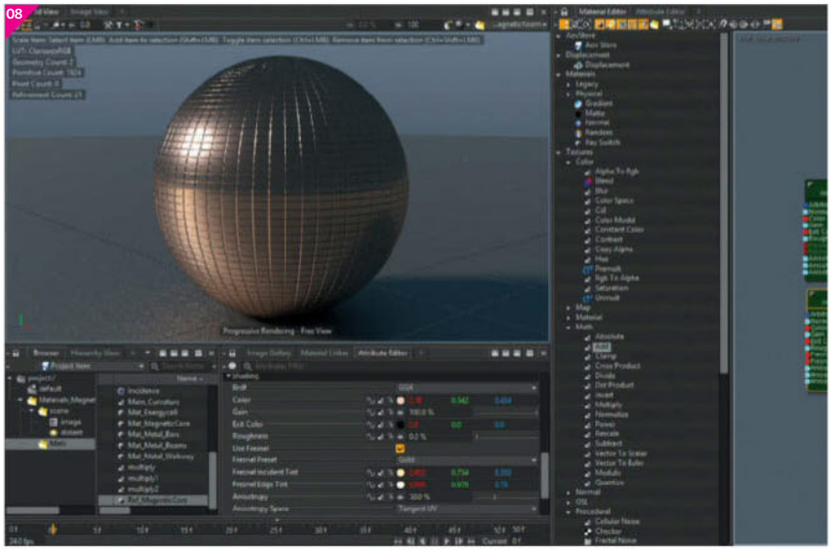
07 Finalise the light emitter To finalise the light emitter we must first set the correct exponent value at the Incidence object – 50%. The Fractal Noise gets a Color 1 of 0.067, 0.604, 0.78. The Color 2 will be a value like 0.078, 0.124, 0.733. The Cellular Noise needs more attribute changes, like a Cell Color value of 0.031, 0.601, 1 and a Border Color of 0.024, 0.136, 0.553. For the pattern we'll choose Scale with 0% Jitter on all axis followed by a Frequency of 16 for each axis. For the Border mode, we'll take Linear with a 35% Border Amount and 100% Border Size.

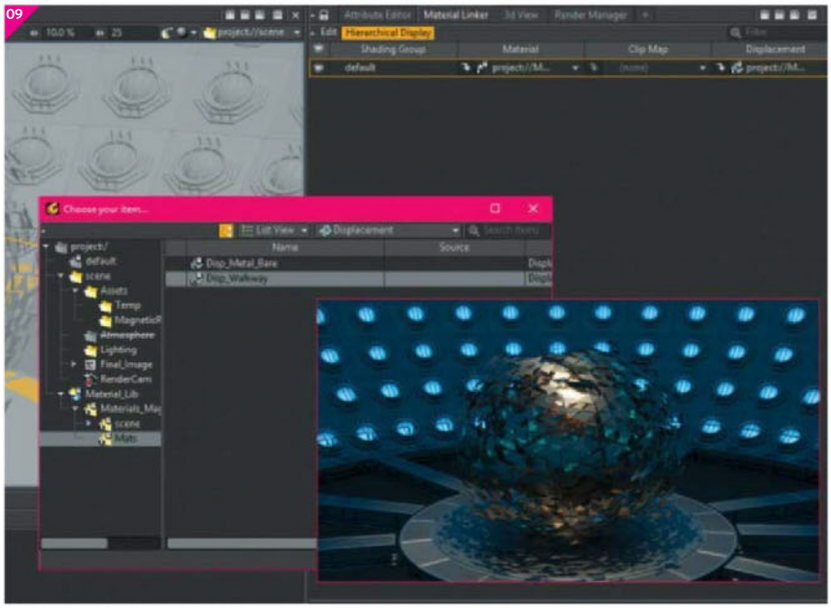
08 Shade the magnetic core For the magnetic core we create a blend physical material and name it Mat_MagneticCore. We choose as base a reflection material and rename it to Base_MagneticCore. For the first layer we create another reflection material and name it Ref_MagneticCore. The base materials will get a roughness of 35% and 35% of the anisotropy effect. The color will be 1.0, 0.8, 0.78 – a warmer color. The layer 1 material must get a warmer color like 0.78, 0.542, 0.434 followed by 0 roughness but activated fresnel with gold as fresnel preset. For the anisotropy we set 30% as value with tangent UV as anisotropy space.

09 Shade the core scene There are many ways to assign shaders to objects – through the Shading layer, which is like an Excel spreadsheet filled with rules that lead materials to objects, or the Material Linker window by selecting Geometry and Add Materials manually. Drag and drop is another way, or material overrides in the Object Attributes. For this example, we chose the Material Linker method. Now we'll assign the materials to the corresponding objects, including the corresponding Displacement objects. The walkway's Displacement will to to the walkway area only, while the bare Displacement will go to all objects except the walkway, magnetic core and energy cells.









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Technique focus

Incredible 3D artists take us behind their artwork

SCULPTING The biggest tool in my arsenal is the Clay Tubes brush. I start at a low subdivision and start building forms by adding and subtracting with the Clay Tubes brush. I like the subtle imperfections across the surface that it usually gives me. I use the Standard and Dam_Standard quite a bit, especially for bringing out edges in bone or shells.

Emanuel Palalic
www.emanuelpalalic.com

Emanuel is a character artist for id Software and spends most of his time making monsters, robots and other creatures

Software ZBrush, Photoshop, KeyShot

Zolton, 2016

ZBrushCore

Is Pixologic's stripped down sculpting tool worth a look?

ZBrushCore is the new digital freeform sculpting package from Pixologic that gives new 3D artists a good start – especially those who always wanted to give digital sculpting a go but didn't have had the budget to jump into the deep end. It looks and feels the same as its big brother, but as an advanced ZBrush user you quickly recognise its limits. Clearly, it's not really made for those who know the ins and outs of ZBrush. Some comparisons with full ZBrush aren't really fair, but they give avid users a good idea of what's actually under the hood.

The whole package is very DynaMesh based, and in theory you can create anything, but with a limitation of 20 million polygons per SubTool. Is this a limitation? Not really – my normal SubTool meshes almost never go over this amount. When opening it for the first time you get a lot of start-up projects to help any new sculptor on their way – trust me, the first time starting from a sphere is hard for everyone. You'll find jewellery, Wacom penholders and ZSphere projects. You still have the option to create a base mesh with ZSpheres, which is a warm welcome if you want to create something that's not straight out of the box. The newer start-up projects clearly show that Pixologic is expanding its user base to include even more novices and the growing 3D printing community.

All the essential sculpting tools are available once you start working on a model as standard – some Clay brushes and some specific brushes like the Dam_Standard, Pinch, hPolish, Inflate, TrimDynamic and a few Insert brushes as well. The only thing that I miss is the lack of really adjusting your strokes and Brush settings – you can adjust some things but it's all limited. However, it really works for creating your 3D sculpts.

When you're done with your sculpting you can easily apply some colour to your model with the Paint brush – just pick a colour and paint away. The good thing about a brush that paints is simplicity – in ZBrush you use a Standard brush and adjust the values to let it paint. By offering a one-click solution, Pixologic has made it so much easier for new users.

What we really like is the clean presentation of the interface. It presents everything very clearly and in a straightforward manner; it's all really easy to use. There's no overwhelming and complex interface. We have heard in the past that the interface of ZBrush was always hard for a lot of novice artists because it was so extended and complicated. With this trimmed-down version, everyone can give it a go, especially because you have a language option in the Preferences tab that gives you the selection of most of the world's common languages.

For me as an experienced user, the biggest adjustment or new thing was the Gizmo 3D tool. It's basically the follow up of the Transpose tool from ZBrush and it just looks very different but works in the same way – congratulations to the makers who have somehow reworked a tool and still kept its basics functioning in the same way.

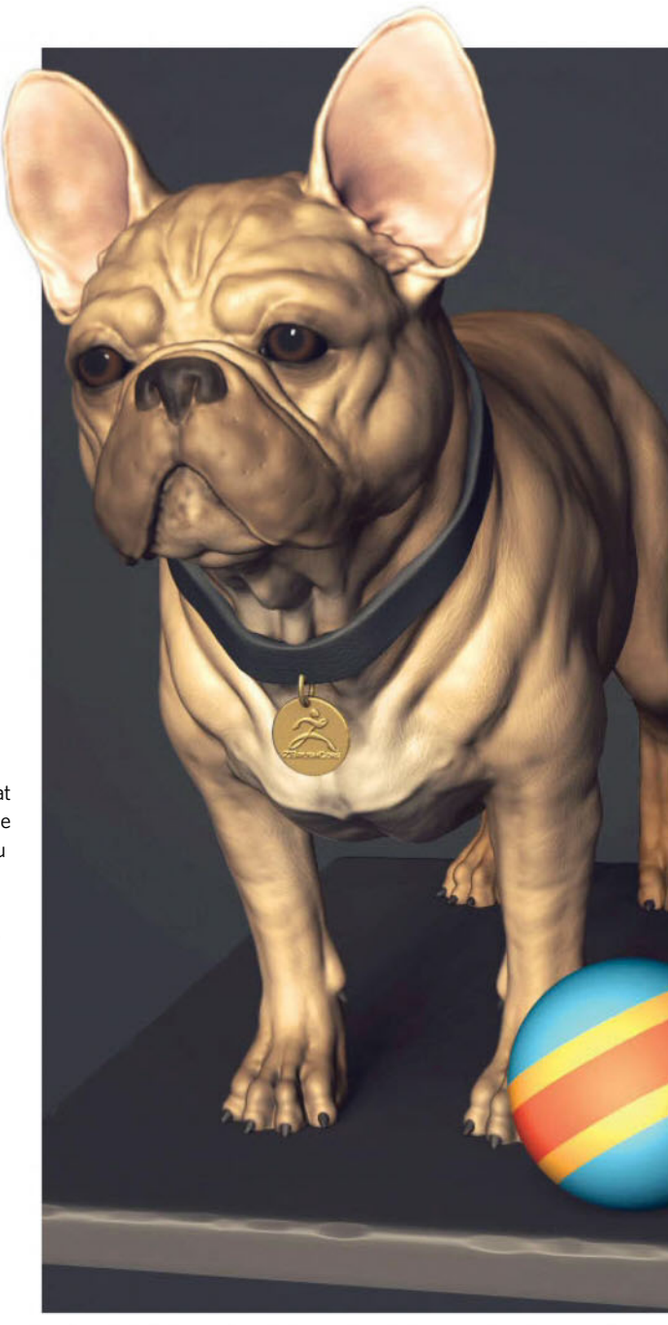
ZBrushCore is pretty much a program that stands alone. You don't save out ZTools, only ZBrushCore's own project files. You can't import Matcaps from ZBrush as it uses its own type of materials for sculpting and rendering.

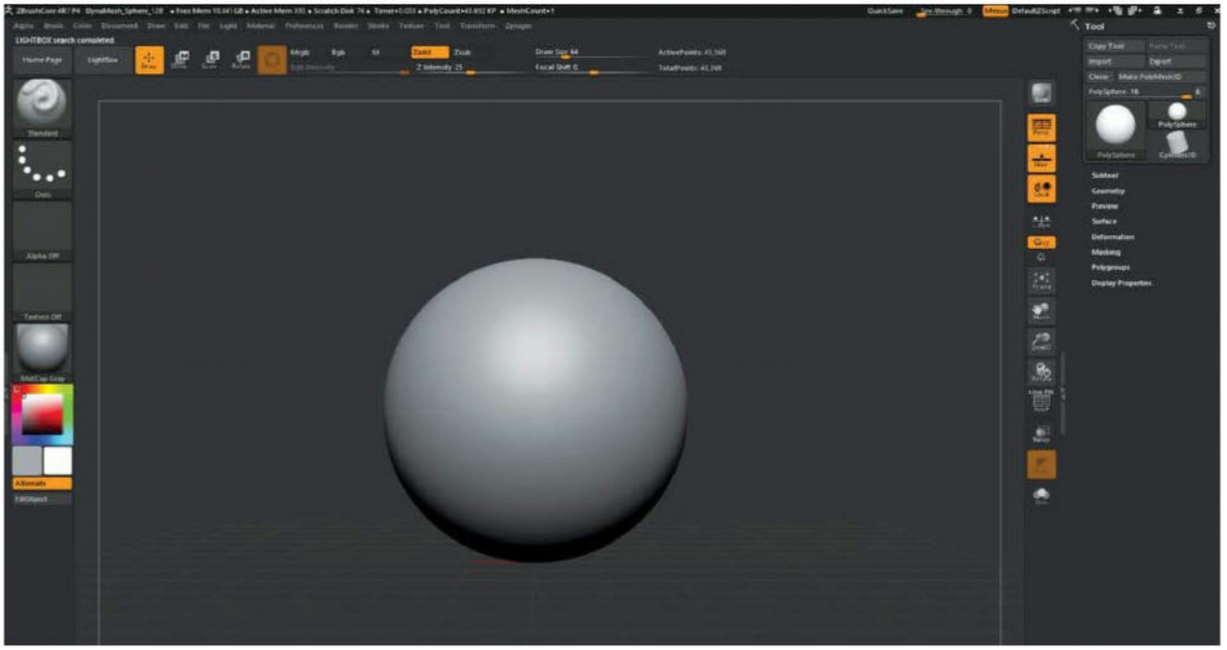
For the renders you can use the BPR renderer from ZBrushCore, but it has a limited resolution depending on your screen size. A good thing is that you always have the option to buy KeyShot and the handy Bridge with ZBrushCore, which enables you to make your models pop with some high-resolution renders.

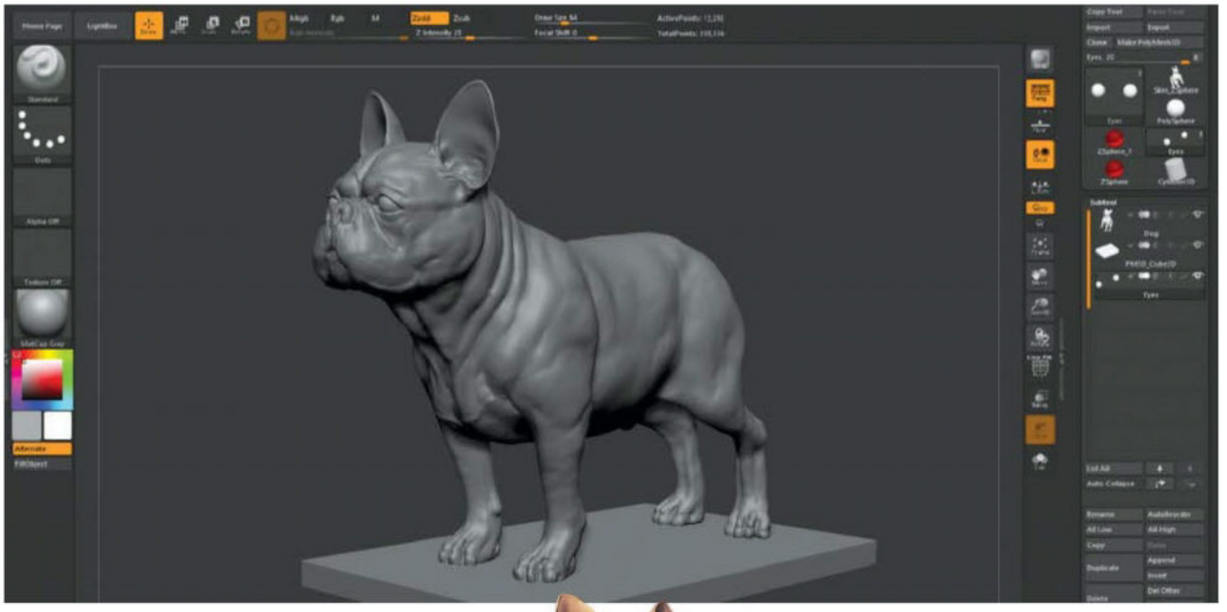
You can import the most regular 3D formats to start working with and it can write out a few formats that can be read by other software packages. A great feature is the Optimize For 3D Print button – this is a Decimation feature that brings your SubTool polycounts back to 100,000 so that you can easily send them to a 3D printer. With this feature you will also find the options to do the same thing with or without colour and directly save it out as an STL or a VRML. It's a one-click printable creation.

Summed up, ZBrushCore is easy to use and a solid package to start with, especially if you're an artist coming from 2D, a jeweller, a maker of printable models or whether you simply love to play with clay! It's out to conquer new territory and steal the hearts of aspiring 3D artists.

Maarten Verhoeven







MAIN The Render setting of the BPR render in ZBrushCore looks nice, but it's limited by screen size, which can be a bit too low resolution depending on your final product

FAR LEFT Using the KeyShot Bridge always gives some nice results to make your sculpts shine

LEFT Building a base mesh with ZSpheres is always a fast way to start sculpting, so it's great to see this feature integrated in ZBrushCore, as starting from a simple ball can take up too much time when working to deadlines

Essential info

Price	$149.95
Website	www.zbrushcore.com
OS	Windows Vista or newer, Mac OS 10.7 or newer (64-bit)
RAM	4GB minimum
CPU	Core2 duo or AMD equivalent with SSE2 technology or better
HDD	8GB of free space
Monitor	1280x1024 monitor (32-bit colour)

Summary

★★★★☆ **Features**
★★★★★ **Performance**
★★★★★ **Design**
★★★★★ **Value for money**

Verdict ★★★★★

ZBrushCore is a solid start for those who always wanted to try digital sculpting and painting

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The Hub

The inside guide to industry news, VFX studios, expert opinions and the 3D community

> It's quite common for any facility in London to be working on six, seven, eight films at once
>
> **Mike Mulholland,** VFX supervisor

Framestore headlines stellar VFX Festival lineup

Previously unseen projects will be exclusively presented for the first time at the 2017 event

The VFX Festival 2017 is shaping up to be an unmissable event. Presented by Escape Studios, part of Pearson College London, The VFX Festival will be host to some of the biggest visual effects studios in the world, as well as a debut presentation of a secret project from Framestore. This year, the Festival is in association with arts and cultural hub Rich Mix and will be held at a new venue from 7 to 9 February 2017.

Those attending include world-leading visual effects and animation facility Cinesite discussing its work on *Independence Day: Resurgence*. MPC will give insight on its ground-breaking approach to filmmaking on *The Jungle Book*. ILM will be presenting on a secret new project to be announced soon. Jellyfish will be discussing the creation of the captivating *Black Mirror* universe.

From the gaming world, State of Play will be discussing its Apple Design Award-winning iOS game, *INKS*. Multi-BAFTA award-winning animation studio Blue Zoo will be talking about CG character animation, alongside animation studio Glassworks.

REWIND will be discussing its VR production. Emmy and BAFTA-winning studio MOMOCO will be highlighting the process of making title sequences, and premiering a new film sequence plus the *Doctor Who* spin-off *Class*.

Dr Ian Palmer, director of Escape Studios said, "The VFX Festival is committed to attracting and showcasing the very best this vibrant, creative industry has to offer in London; whether it's from VFX, gaming, motion graphics or animation. Now in its fifth year, the 2017 festival will be our boldest offering yet. Whether you're already established in the industry, looking to network and raise your profile, or find out how to break in to it, we've something for everyone over three jam-packed days."

Also at the festival is the Schools Day, which will feature workshops from industry leading experts on 7 February 2017. A talk from London Creative Edge will detail 'How to Break into the Industry'. Creative Skillset and 3Dami will be hosting an exclusive session too, with Climax Studios providing more specialist advice on getting into the games industry and animator Alex Williams giving top tips for

aspiring film animators. Then, the following two days will be targeted at graduates, enthusiasts and professionals, with headline talks and recruitment sessions from various award-winning studios.

The second day of the show, 8 February 2017, will be headlined by Danny Yount, who will be flying in from LA to present on his career-defining title sequences with a presentation titled 'Stories In Motion: Main Titles'. His work can be seen in all three of the *Iron Man* films, *Six Feet Under*, *Tron Legacy* and more. Other talks include Blue Zoo on 'Masterclass in Cartoony Character Animation', Seed Animation on creating your own work, Aardvark Swift explaining how to get into the games industry with 'Get in the Game' and JM Blay discussing motion graphics. Alongside these, MPC Advertising will be showcasing previously unreleased work, Man vs Machine will be exploring procedural workflows with Houdini, Climax Studios on 'The Challenges of VR Development for Games' with more talks from other companies and experts working in visual effects that are yet to be announced.

The final day will be headlined by Framestore, with presentations from teams including Cinesite, MPC, The Mill, Creative Assembly, REWIND, State of Play, Glassworks and also MOMOCO.

Tickets are available from £55 per day, or buy combined tickets for 8 and 9 February with a ten per cent discount. Buy now from **www.thevfxfestival.com**.

Exclusive and never before seen presentations will come from the likes of Framestore and ILM

Get one-on-one tuition from Oscar winners

CG Spectrum has launched new courses and diplomas with personal advice from industry veterans

Online animation and VFX school CG Spectrum has revealed a fresh structure of diplomas, including the 1-on-1 Diploma from a personal industry mentor. As well as working on the course with the mentor, students can get advice on their reel as well as help on solving any other problematic areas. Tuition doesn't just come from recorded videos, though, as the Diploma also includes live feedback sessions with the experts. Priced at $9,995, the 1-on-1 Diploma contrasts with the typical three and four-year programmes of study, which can cost upwards of $100,000.

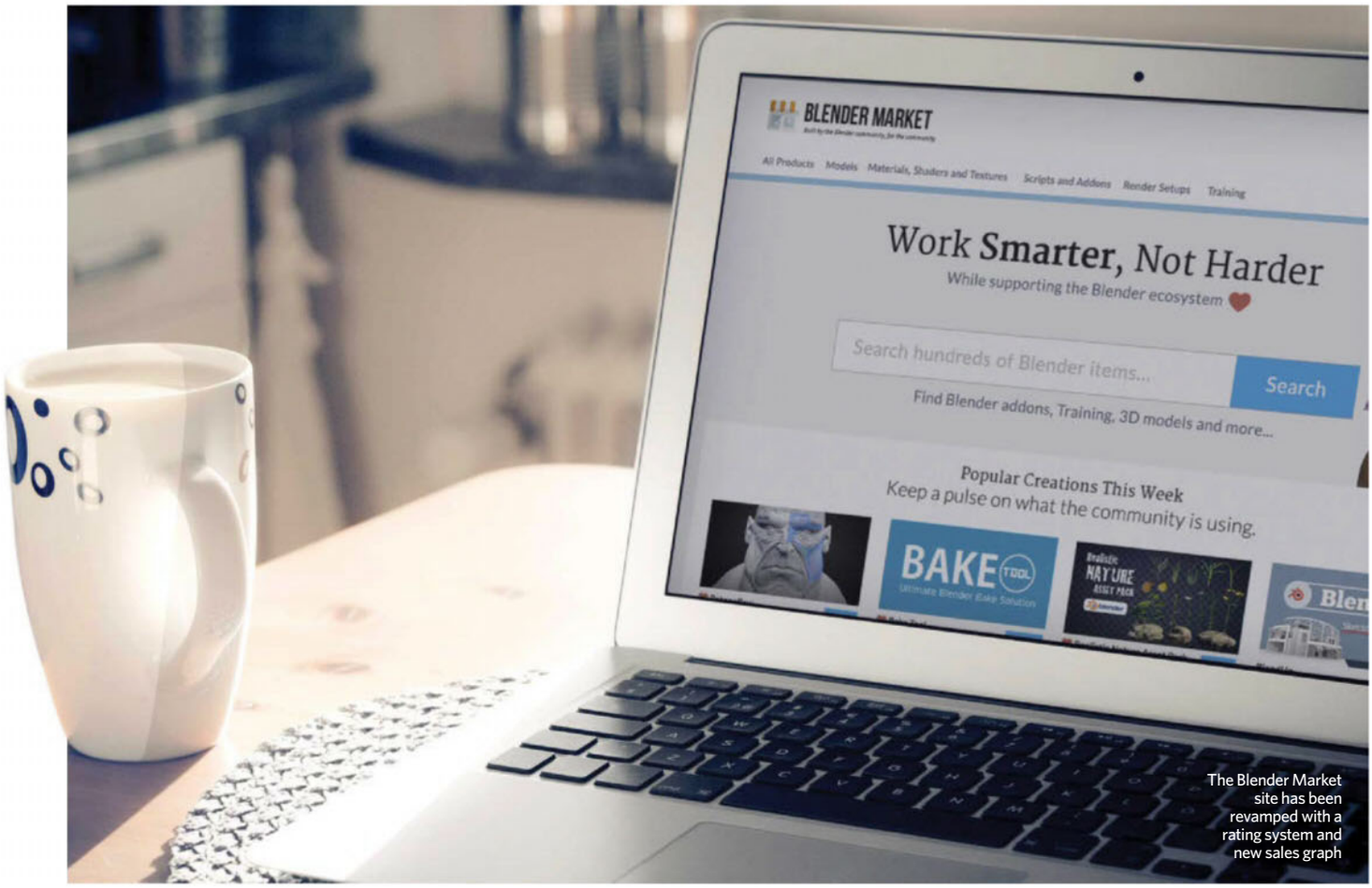
Mentors all have a high level of studio experience and most teach on CG Spectrum in addition to their freelance or studio work.

Some of the mentors for the 1-on-1 Diploma includes Frank Alvarez for modelling (*Game Of Thrones* and *Star Trek Beyond*), Gyuri Kiss for VFX (*Mad Max: Fury Road* and *Watchmen*), Mark Pullybank for animation (*Avatar* and *The Hobbit*) and Nick Fredin for animation (whose studio won an Oscar for *Rango*).

"This is where the online model really shines," says Fredin, who is also the CG Spectrum co-founder. "We're able to hire mentors from all over the world who are right in the thick of the industry. We can work around their availability and schedules. It allows us to deliver the best possible education to our students."

Advanced students can then also use the CG Rentamentor site for getting personal instruction from an expert and brush up on a specialist area for six weeks or ten weeks.

The courses will begin monthly from January 2017. Find out more at **cgspectrum.edu.au**.



The Blender Market site has been revamped with a rating system and new sales graph

Blender Market refreshes site

The community marketplace for Blender assets launches new website with lots of improvements

Founded by Blender trainer CG Cookie in 2014, Blender Market – the only marketplace dedicated to Blender – has relaunched.

Blender artists can get paid for their work on Blender Market and professionals can grab tools, such as Retopoglow or Mirage, to improve their results and their Blender workflow. The Market offers over 600 products.

After an incredible 100,000 lines of code being written in five months, new features on the Market have been debuted – all built with user experience in mind. The purchasing experience, for one, has been enhanced with a rating system that provides customers with the ability to feed back about the product or check insight from those who have previously bought and used it.

It's also easier to receive support from the product creators themselves through the centralised inbox, and downloads can be accessed effortlessly in the My Accounts page. All vendors are now called Creators, with Blender Market explaining in a blog that this was to remove the "colder" and more "businesslike" feel in favour of a more inspirational term.

Creators can now add partners to their products with revenue split automatically, while homepage product rotation and product search have been improved, the blog layout has been updated and the Creator shop page has been revamped. Product submission forms have been redesigned and a new sales graph provides instant earning figures for both total and individual products from the Creator as well as donation values.

Comments have also been split into two areas, with one on 'Pre-sale questions' for any questions regarding the asset prior to customer purchase, and another one for reviews.

> "We've rebuilt it from the ground up, utilising a more modern framework, enabling us to iterate frequently and put more power into the Creator's hands"
>
> **Jonathan Williamson, project lead**

Project lead Jonathan Williamson said of the relaunch: "The new Blender Market site is the next step in building a sustainable marketplace where independent Blender artists and developers can create a livelihood for themselves. We've rebuilt it from the ground up, utilising a more modern

framework, enabling us to iterate frequently and put more power into the Creators' hands to reach their customers, provide better customer support and grow the Blender ecosystem for everyone."

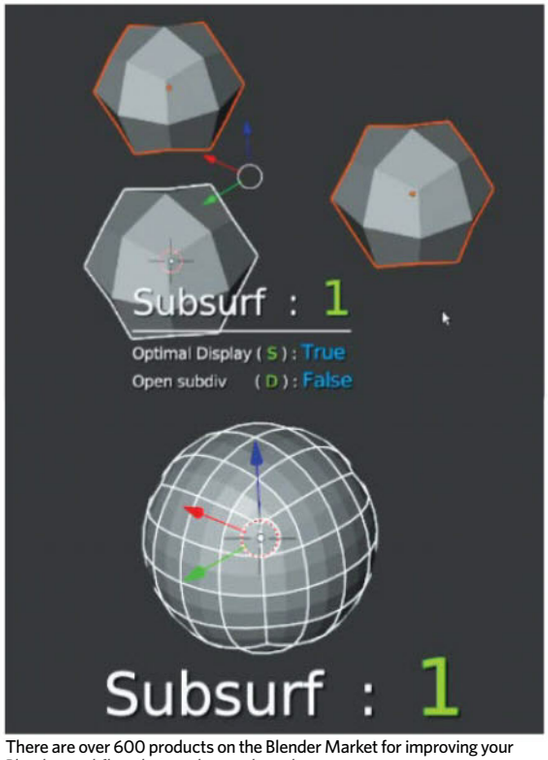
Wes Burke, the CEO of CG Cookie, Blender Market's parent company, highlights the Market's role as a powerful creative incentive for developers since its launch in 2014: "Over the last two years we've witnessed an uptick in Blender asset creation that didn't exist before," says Burke. "This is an indicator that Blender Market sparks innovations by providing an incentive for Blender developers to create products needed by the community."

For Creators, the Blender Market has paid out over $210,000 to Blender artists selling through the Market since its inception, with an average of $9,200 being paid out monthly throughout 2016.

Jim Morren, a Blender Market Creator says: "Selling my work at the Blender Market has been more successful than I anticipated and a big part of that is the great support from the crew and communication with fellow Creators. The best part of it is that the extra income allows me to spend more time doing what I love."

Blender Market is one of the main sponsors of the Blender Development Fund, the fund that supports the improvement of Blender. It contributes a portion of proceeds each month towards work on the open-source software through the Creator Contributions, with an average $840 a month donated and $20,000 donated since 2014.

For more information on becoming a Blender Market Creator or to purchase one of the hundreds of assets on offer, visit **www.blendermarket.com**.



There are over 600 products on the Blender Market for improving your Blender workflow that can be purchased

The Granite Shader Pack by Pixelpoems.de can be purchased for $12 on Blender Market

Win big in the SideFX Marvelous Machines contest

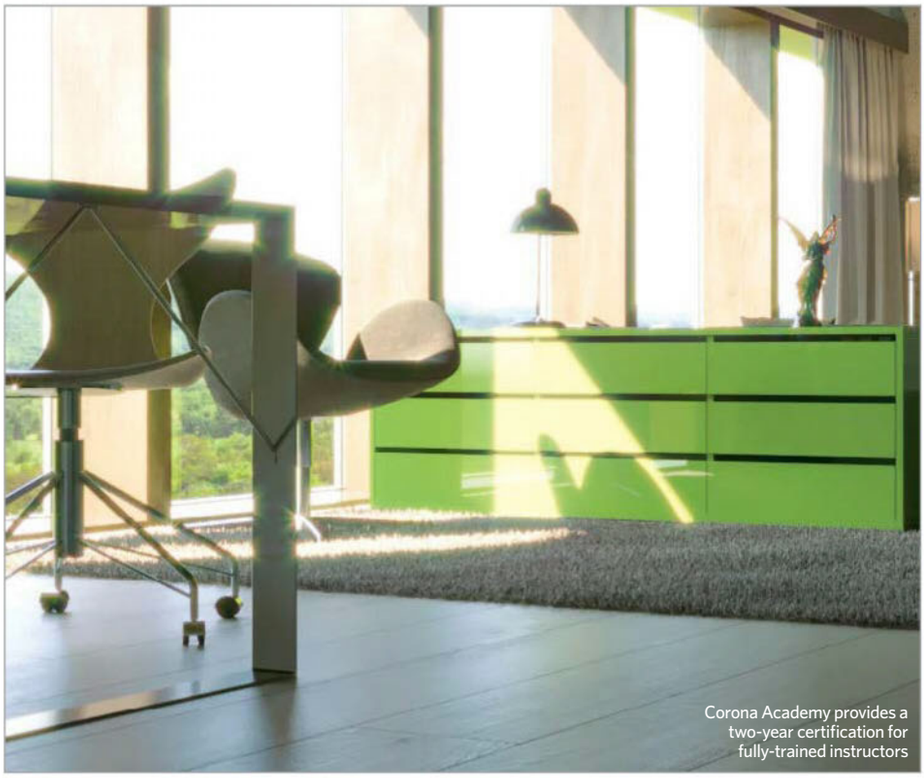
There's still time to enter your mechanical creations!

The Marvelous Machines competition with SideFX is at its halfway mark now, but there's still time left to enter and be in with a chance of winning a Dell UltraSharp 30-inch PremierColor monitor, Houdini FX, AMD Fire Pro W8100, Intel SSD 800GB, **3D Artist** subscription and a Pluralsight subscription – and that's just for the Best Overall award alone. There are also first, second and third prizes for the Image category and the Animation category, as well as a Splashscreen award, where your entry could end up being the next Houdini splashscreen among other amazing prizes.

Remember, you can use other software to create your machines, but the more Houdini and Mantra is used, the more brownie points you'll get in the judging process. If you end up using COPs instead of Photoshop or After Effects, for example, that will be taken into consideration during judging too.

Solo entries are recommended, but you can work in teams if you are able to split the prizes between yourselves!

The winners, runners-up and other entries will be announced on 15 February on **www.sidefx.com/contest-2016**. Make sure you keep an eye out!



Corona Academy provides a two-year certification for fully-trained instructors

Corona debuts training academy

Render Legion headquarters is home to course

Render Legion has started a series of Corona Academy training sessions right in the heart of Prague. "Corona Renderer 1.0 was released almost two years ago, and it felt like the right time to start training people ourselves. That's why we're starting the Corona Academy – after all, nothing beats training direct from the people who wrote the software!" says Adam Hotovy, partner, business and sales at Render Legion.

Why become a Primary Certified Instructor?

Outside of being able to teach your own Corona courses, some of the benefits from completing the Corona Academy course are one free Corona Renderer licence for the duration of your certification, licences for students during the courses and ten per cent discounts on a yearly licence.

The first Corona Academy in November 2016 was taught by Ondrej Karlìk, the main developer of Corona Renderer. "We want training to be available worldwide so that people don't have to travel too far and can get training in their native language, where the students know that the information in the course they are taking is accurate and useful," adds Hotovy. "That's why all those who successfully complete the Corona Academy training will become Primary Certified Instructors."

Instructors will be able to organise and charge for their own authorised Corona Renderer Educational Courses. They'll also be able to certify other instructors. The sessions will teach understanding of the Corona Renderer philosophy, identifying and correcting sources of noise, keeping scenes quick to render, procedural material effects with CoronaAO and much more. Attendees must have a high level of familiarity with 3ds Max and Corona, as well as being fluent in English. The second course is planned for March 2017.

RealFlow unveils anniversary edition

Version 10 is a special release with a new multiphysics solver among other features

The team at RealFlow and Next Limit has celebrated a milestone with the release of version 10.

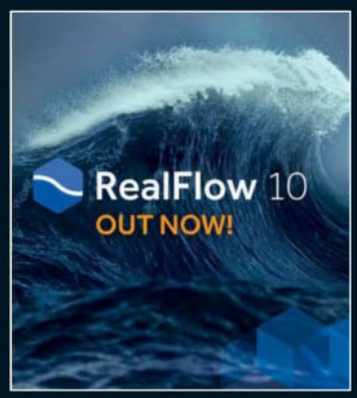
RealFlow 10 will have a new multiphysics solver for Dyverso, capable of doing rigid, elastic, granular, viscous and viscoelastic simulations.

Dyverso has also been treated with double the GPU efficiency. Hybrido, meanwhile, gets a speed improvement.

A new particle skinner daemon transfers particle motion and animation (as a whole particle system) to geometry objects, while a new K volume object mode means that any object can be used to remove particles that are placed inside.

A Fall-off Object mode means that objects can be used to fade a daemon's forces and control exactly how they should vanish.

Other features to receive improvements include the project manager, Bitmap Emitter, continuous collision detection which now has 4K support and a time scale for Hybrido secondary emitters and much more.



Every single node now has its own export panel in RealFlow 10

HAVE YOU HEARD? Marvel's EVP Victoria Alonso will receive the Visual Effects Society's Visionary Award in February 2017

UE adds forward renderer for VR

New version of the game engine integrates a new VR tool

Version 4.14 of Unreal Engine is an exciting update, with a brand-new forward shading renderer for VR – the same renderer used in upcoming VR game *Robo Recall*. There is also a new contact shadows render and an automatic LOD generation for static meshes, which will save time on building content without a third-party library. Animation tools are streamlined, with new features added to the non-linear cinematic tool Sequencer. C++ programmers on Windows can use Visual Studio 15 and Vulkan API is supported on Android, with mobile rendering features like reading from scene colour added. Per-pixel translucent lighting has also been improved, with the new forward shading functionality useable on translucent services for specular highlights from multilights, and image-based reflections from parallax-corrected reflection captures.

The Surface ForwardShading option in Unreal Engine 4.14 now has better per-pixel translucent lighting

SiNi debuts three new tools

The software developer releases its first suite for 3ds Max

SiNi Software has made three new tools available to go alongside its existing products for 3ds Max, Forensic and Scatter. IgNite is a workflow suite that assists with modelling animation and rendering workflows with a networkable playblast, CAD cleanup and retopology tools. ProxSi is a universal proxy plugin that helps you to swap out proxies, instances and their assigned positions seamlessly between renderers. Finally, SiClone is a parametric modelling tool that can array multiple 3D objects along splines with independent parameters and control. Learn more at **www.sinisoftware.com**.

KeyShot for Revit revealed

Plugins for 3ds Max, Maya and Fusion also updated, with KeyShot 7 underway

Luxion, the developer of KeyShot, has made a new plugin for Revit available. The KeyShot for Revit plugin will support Revit 2015 to 2017, with LiveLinking model update technology, maintains the family structure, and has support for camera export, export of RPC placeholder objects and matching Revit compass. Meanwhile the plugins for 3ds Max, Maya and Fusion have all been improved with support for the latest software versions and much more.

KeyShot 7 was made available for pre-order on 25 November 2016, with new features including real-time and render output viewing for a VR headset, import, playback and output of deforming mesh sequences and more. For more information, visit www.keyshot.com.

KeyShot for Autodesk plugins are free to download from the Luxion site

Software shorts

Bringing you the lowdown on product updates and launches

3ds Max 2017.1

New features have been added to 3ds Max 2017 with Blended Box Mapping that projects a map directly onto a mesh, a Data Channel Modifier for modifying information from a mesh into different forms such as a selection and MaxtoA reaches 0.80 with support for photometric lights in Arnold among others.

RenderMan 21 Non-Commercial

The Non-Commercial release of RenderMan 21 is out now. New features include production shaders and lights from *Finding Dory*, Denoise improvements, the All in One Pixar Shader, new libraries for lights and surfaces, deformation volume blur, API improvements and much more.

QuatTwist 2.0

The free Maya plugin from Brave Rabbit has been updated, providing more stable animation. QuatTwist replaces common twist setups based on constraints to the transform you want to handle the twist and gathers all the relevant quaternion-based data for the calculation. It also has additional controls and segmentation attitudes.

DID YOU KNOW? Thanks to continual support from sponsors, Blender 2.8 will soon be assigned ten full-time developers

Job title VFX supervisor

Location London

Education Computer Animation and Visualisation BA (Hons) – Bournemouth University

Website www.ilm.com

Biography Mike Mulholland started as a generalist at Cinesite in 1999, before moving to San Francisco later and working on *The Matrix* sequels. He then returned to the UK and worked at Framestore for ten years, initially as a rigger before moving on to become a CG supervisor and VFX supervisor. He's been at ILM London since 2014.

Portfolio highlights

- *Star Wars: The Force Awakens*, 2015
- *Avengers: Age of Ultron*, 2015
- *Jupiter Ascending*, 2015
- *Gravity*, 2013
- *War Horse*, 2011
- *Where The Wild Things Are*, 2009
- *The Chronicles Of Narnia: Prince Caspian*, 2008
- *X-Men: The Last Stand*, 2006
- *The Matrix Revolutions*, 2003
- *The Matrix Reloaded*, 2003
- *Band Of Brothers*, 2001

Mike Mulholland

The VFX supervisor discusses ILM London's work on Star Wars and Soho's growth as a VFX hub

Mike Mulholland hasn't been in Bournemouth in two decades, but he's returned triumphantly to the British town where he had spent his formative university years now as a visual effects supervisor for *Star Wars: The Force Awakens*. We first met Mulholland at BFX Festival, where he gave a presentation on the digital effects in *The Force Awakens*, alongside supervising art director Kevin Jenkins, to a packed auditorium of inspired students.

He tells us that the south-coast town hasn't really changed much, but instead attests to the change that London has experienced in the last 20 years. "I started at Cinesite back in 1999 and during that era, the VFX work in London was much smaller than it was now. The VFX companies didn't really do that much film if any at all. It was mostly commercials or TV specials in that kind of era... Then a year or so later, the film projects started coming in a bit more, like the first *Tomb Raider* and the *Harry Potter* franchise."

After a stint in San Francisco, Mulholland returned to the UK to work at Framestore and he was greeted with a growing industry. "I moved into CG supervision and worked on a number of films, like *The Chronicles Of Narnia: Prince Caspian* for example. We were rebuilding Aslan the lion, which was quite a big technical challenge at the time because it was one of the first big fur jobs that was done in London."

Mulholland got to talking with ILM during the initial setup of the London locale in 2014 and ended up joining as a visual effects supervisor. He immediately started on ILM London's first project, *Avengers: Age Of Ultron*. "We did half of the Hulkbuster sequence and then numerous pieces of the third act. That was a great opportunity and a fascinating introduction to ILM. You're moving companies so you're learning a new toolset, plus people you're working with have all come together from different companies because it's a new startup essentially, so it was a really fascinating time."

Mulholland then took over on *The Force Awakens* as VFX supervisor after creative director and ILM London founder Ben Morris left the role. "I spent about six months executing the shots, finishing off any of the dev work, the build work and going through the shot execution side of it all.

"So far ILM London has been growing the last couple of years and will have multiple films going through it at once," continues Mulholland. "It's quite common for any facility in London to be working on six, seven, eight films at once." Key to the work at ILM is the use of unified shaders, explains Mulholland. "I can go in, assess texture artists' work and look at their work in MARI and comment on it, knowing that when a lighter picks it up it's going to look the same."

But he argues that it's not just a case of the shaders' improving efficiency. "[Murphy's Law] is that computers will get faster, [but the] problem is what we're trying to render gets more complicated with every project... I wish it got faster but it doesn't! It just gets more complicated!"

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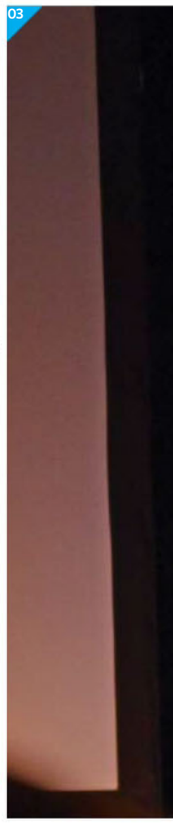

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REIGNITING THE MILLENNIUM FALCON

Mike Mulholland tells how the archived physical models of the fastest hunk of junk in the galaxy were re-created in 3D

"The tools we've got available to us now mean that we can take photos and take them into photogrammetry, and give ourselves a 3D representation for those. We'll use that as a reference because we'll always do a completely fresh build, but it's a really great way of being able to take that reference and processing it into 3D very quickly."

04

05

> We were rebuilding Aslan, which was quite a big technical challenge at the time because it was one of the first big fur jobs
>
> **Mike Mulholland, VFX supervisor**

06

01 ILM London uses more proprietary tools "than other London facilities" says Mulholland

02 Matte paintings from the original trilogy provided reference points for the new films: "A massive part of it is shot composition," explains Mulholland

03 Mulholland and supervising art director Kevin detailed the digital effects in *Episode VII*

04 ILM created 2,100 shots for *The Force Awakens* with two years of VFX involvement

05 At BFX Festival, Mulholland showed an environment rebuild of a practically built Millennium Falcon scene

06 For *The Force Awakens*, ILM London worked on the action sequence where Rey first meets Finn as well as specialising in Maz Kanata

Images of the month

These are the 3D projects that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

01 Muse
by Danny McCabe
3DA username Danny Mac
Danny McCabe says: "If you want your art printed in a magazine, work from a concept by Jessica Madorran."
We say: *Great advice, and Danny has done Jessica's superb concept justice with this interesting render. Intelligent use of glossy, reflective materials for the eyes and body add an extra layer of magic and the underlying sculpt is well detailed.*

02 ECHO
by Denis Zhitnik Khamash
3DA username SHD
Denis Zhitnik says:
"I did this picture after a visit to the Prado Museum in Madrid, Spain. It was a big inspiration for me! For this work I used 3ds Max, ZBrush and FStorm Render"
We say: *Re-creating one classical sculpture is hard enough – building a whole room full of them is something else altogether. This is a really well presented and well lit scene.*

03 Japanese Room
by Aref Razavi
3DA username Aref Razavi
Aref Razavi says: "The first idea has born when I saw the movie *Rurouni Kenshin* in 2012, I loved that space and also the architecture, so I decided to create a Japanese-style room of my own."
We say: *One of the many interesting things about this scene is that the exterior environment is just as interesting as the interior. Solid work throughout. Congrats!*

04 The Special One
by Miguel Teixeira
3DA username Miguel CBT
Miguel Teixeira says: "This artwork represents a gifted and aged warrior, who even after all the battles he's been through, is still smiling. I used 3ds Max, mental ray, ZBrush and Photoshop to put this scene together."
We say: *This is a superb character design from Miguel and we were astonished by the amount of detail he's achieved in his model. Of particular note are the engravings on the armour.*

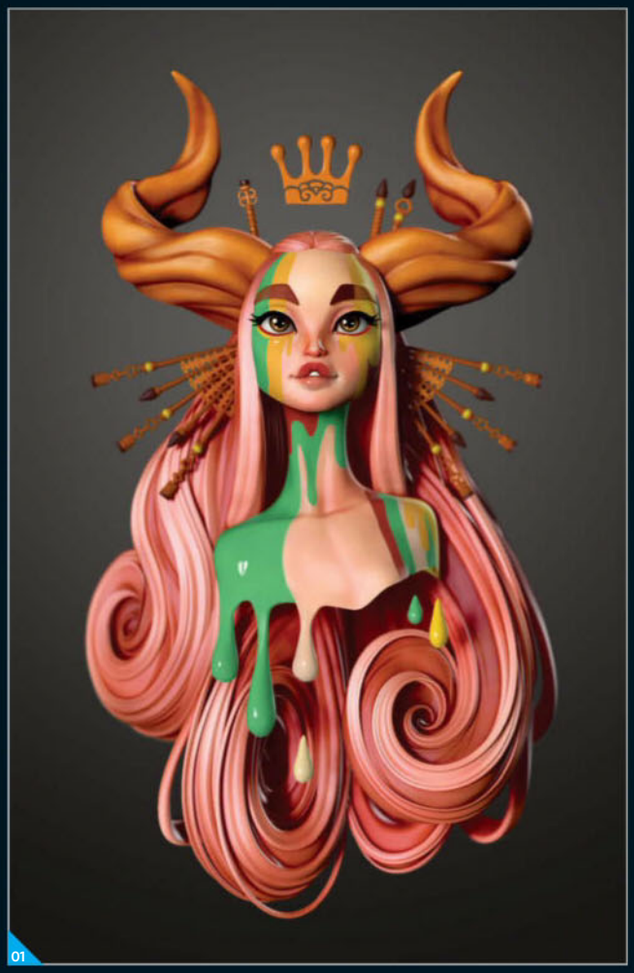
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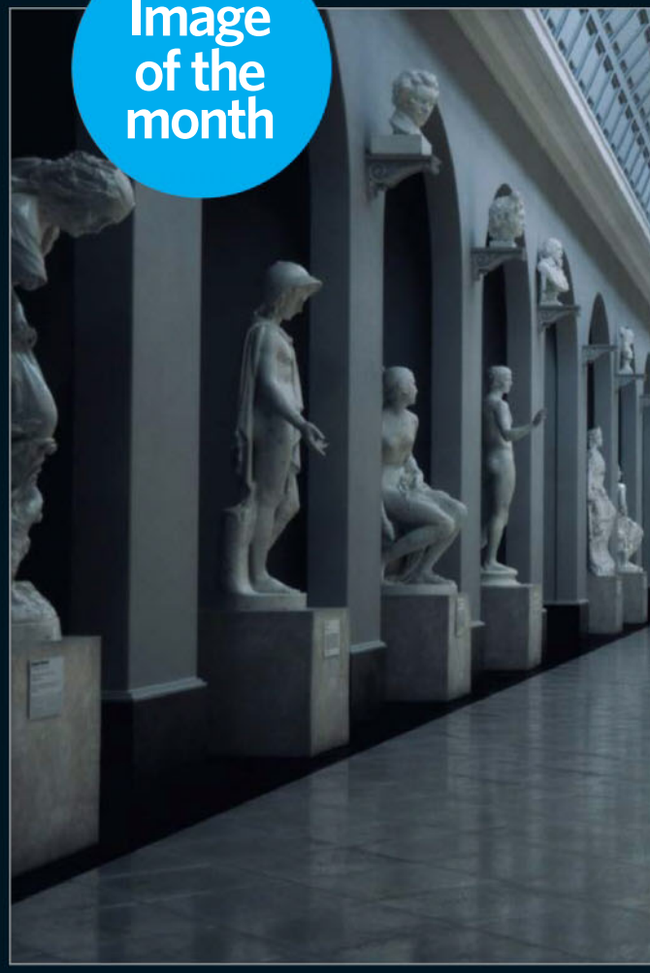
Image of the month

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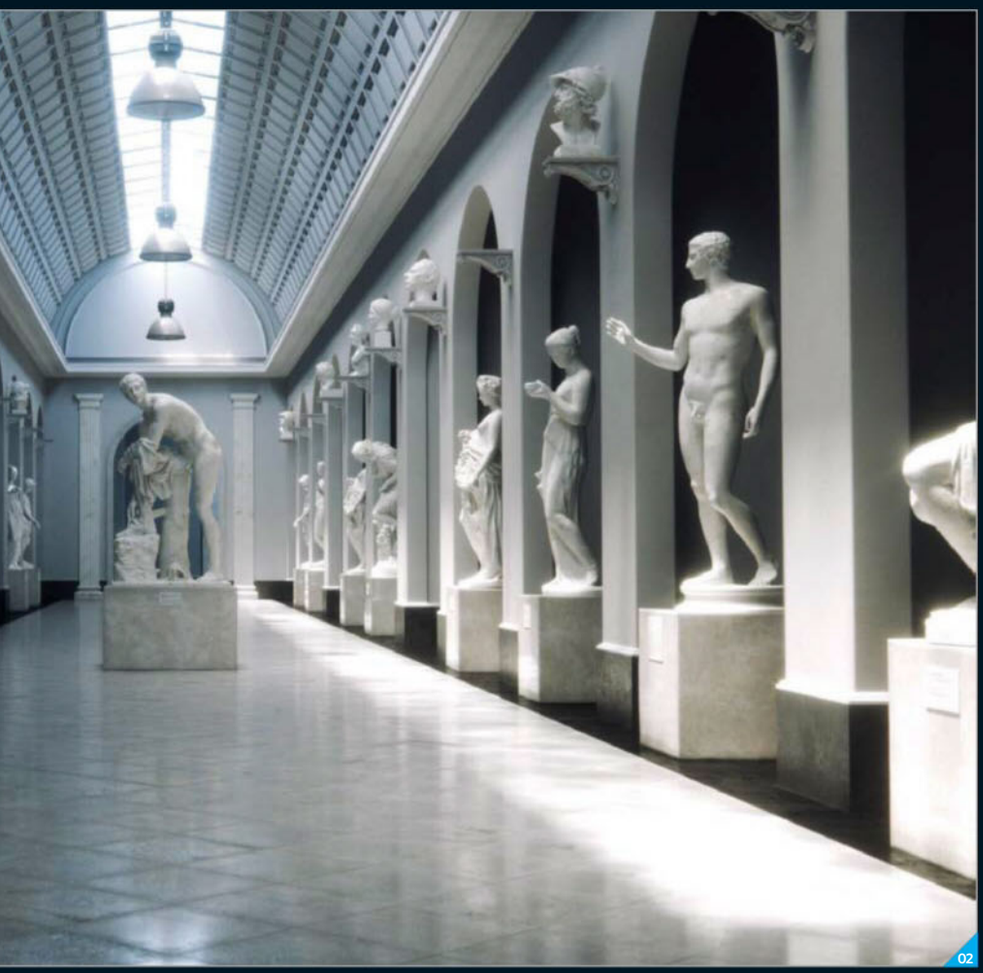

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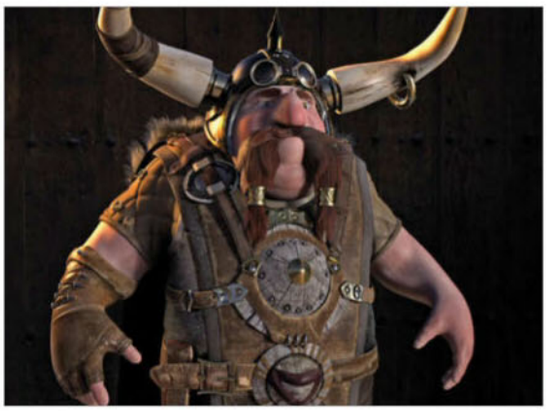
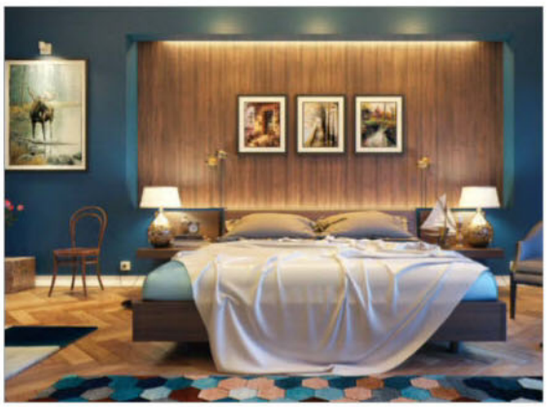


The Viking **by Jamie Hearing**

3DA username Jamie Hearing

Jamie Hearing says: "This project was a chance for me to develop my skills in between university assignments and create a fun, stylised and unique character."

We say: *There's a really nice style to Jamie's character, and it kind of reminds us of the exaggerated forms seen in Pixar's* Brave. *We really like the texture work on the hide and leather of his clothing.*



Wooden Bedroom **by Mohamed Sabry**

3DA username mohamed86s

Mohamed Sabry says: "I wanted to create different to my old works, so I decided to use new colours and set up the lighting to create a peaceful mood. I chose inky blue and brown. I used an HDRI for external light and artificial lights. To build the scene I used 3ds Max, V-Ray and Photoshop for post-production."

We say: *A delicate cloth simulation and intelligent lighting really elevate this well presented interior scene.*

Haus Lademann **by Marcus Büttner**

3DA username Marcus Büttner

Marcus Büttner says: "Visualisation of the famous 140-year-old Haus-Lademann in Berlin, a high-end conversion of the historic riverside building in Berlin's central district."

We say: *What leapt out first and foremost when we came across this render was the camera perspective; it's not often you're put in a boat in a scene! Strong lighting, good HDRI use and well-modelled arch vis make this a winner.*

Technique focus

Incredible 3D artists take us behind their artwork

MODELLING Realism was the most important part of this project. I have been building characters for a while but details are always the most time consuming part. To create small details I used the displacement maps from TexturingXYZ, projected those into MARI and imported the resulting map as a displacement map in ZBrush.

Marlon R Nunez
www.mrnunez.com

Marlon is a self-taught artist in the CG industry, creating characters for games and VFX

Software ZBrush, 3ds Max, MARI, Marvelous Designer

Gandhi, 2016

>> When asked who we are and what makes us unique? We thought there is no one thing.

Here are 5...

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