

SUBSTANCE PRO GUIDE INSIDE

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EXPERT
MECH
DESIGN

PAGE 30



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Master dynamic characters

Page 50



João Victor Ferreira
joaovictor3d.com

Software 3ds Max





Discover the blueprint for incredible mech design
Page 30

Welcome



As I hit the big green button to send this issue to press we're in the middle of this year's GDC festivities. It's a show that I'd love to go to myself one day, as it looks like a hell of a lot of fun. Its exhibitor content raises a lot of questions about the future of computer graphics, though.

One thing seems certain – technologies and techniques across different fields like games, movies, TV and visualisation work are starting to merge. A vast array of the real-time technologies on the show floor at GDC are creeping into other industries at a startling rate, and apps like Unreal Engine and Allegorithmic's Substance

tools are starting to include functionality that could see them break out of games and into other diverse fields in the future.

If you fancy taking the next step in Substance, we've got the guide for you this month. We've also compiled a blueprint for perfect mech design, environment artists from Rodeo FX, Atomic Fiction and Cyan, Inc take us behind the scenes on amazing projects like *Deadpool* and *Game Of Thrones*, and the awesome team at Zero VFX takes us on a tour of the studio.

And finally, if it's tutorials you're after, our expert panel has smashed it again with amazing guides for 3ds Max, Houdini and much more. Have fun!

Steve Holmes, Editor

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– Vladimir 'Vlado' Koylazov

2017 Scientific & Engineering Award



The Expert Panel

This issue's team of pro artists...



JOÃO VICTOR FERREIRA

joaovictor3d.com



We see so many character designs on a daily basis that they can quickly blend into one. However, with an eye for posing, perspective and design like João's, your characters will stand out easily.

3DArtist username n/a

ANASTASIA OPARA

anastasiaopara.com



Despite still studying, Anastasia's formidable talent for creating stunning environments using Houdini's procedural tools displays an understanding well beyond her years. Her tutorial is on p58.

3DArtist username n/a

JONATHAN BENAÏNOUS

jonathan-benainous.blogspot.com



Jonathan returns to the pages of 3D Artist this month to take you through his tried and tested workflow for building triple-A videogame assets. He's worked on some *huge* games, so take note.

3DArtist username Jonathan Benainous



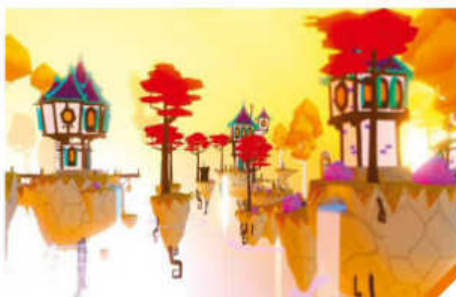
TOM HANKINS

www.colorbleed.nl



Tom joins us from the awesome team at Colorbleed to demonstrate how Blackmagic Fusion can really enhance your cinematic projects. Check out his guide over on p72.

3DArtist username n/a



PAUL CHAMBERS

paulchambers3d.com



You might remember Paul from issue 98 when he showed off his phenomenal Papercraft Island project. In a similarly vivid visual style, Paul is over on p76 talking about creating assets for VR.

3DArtist username paulchambers3D



RAINER DUDA

rd-innovations.de



Master of destruction (and other cool stuff that Houdini is brilliant at) Rainer has turned his hand to review writing this month, as he takes Houdini 16 for a walk around the block on p82.

3DArtist username Rainerrd



BEN KEELING

benkeeling.co.uk



Version 6 of Allegorithmic's awesome material authoring tool, Substance Designer, is out now. Ben has taken a break from making stunning games to put it through its paces on p84.

3DArtist username n/a



PAUL CHAMPION

linkedin.com/in/pchampion



There's an awful lot to be said for invisible effects for film and TV. On p36, Paul has spoken to the talented team at Zero VFX about its past, present and future, as well as developing a character pipeline.

3DArtist username Rocker



IAN FAILES

vfxblog.com



We've met a few people at events recently and a huge amount of them told us they wanted to be environment artists. On p42, Ian sits down with some of the best in the business.

3DArtist username n/a

IMAGE COURTESY OF VAHID AHMADI



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Review: Houdini FX 16

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“Rigging will inform the software how the animation will look at render time”

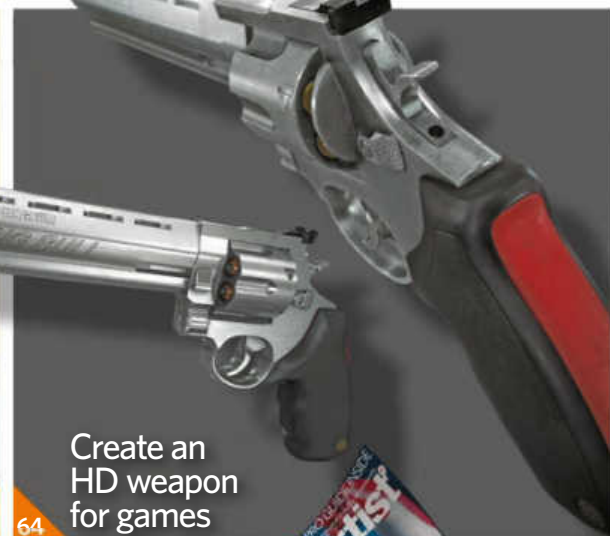
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Build realistic procedural structures

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“The city chase ended up in a real-world version of Vancouver. We looked for really great references to build up the town”

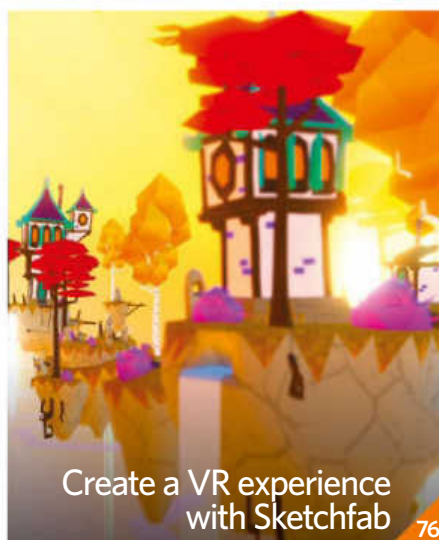
Ryan Tudhope from Atomic Fiction discusses *Deadpool's* frantic chase scene
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Wojciech Piwowarczyk
wojciechpiwowarczyk.com

Wojciech is an environment artist and creates worlds for games, short films and TV
Software 3ds Max, V-Ray, Quixel SUITE, ZBrush

Work in progress...



“I created this image for an ArtStation challenge and was lucky enough to win first prize. I focused on storytelling and tried to create something everyone can relate to. I decided to get inspiration from personal experience and capture a moment from a family vacation as my interpretation of the theme - The Journey”

Wojciech Piwowarczyk,
The Journey, 2016





Shubham Mehta
shubhmehta.artstation.com

Shubham currently works as a lighting and look development artist in Bengaluru, India

Software Maya, V-Ray, Photoshop

Work in progress...



“To attain realism in my artwork I created Raspberry in my spare time. This piece of art was also good experience in creating realistic renders, as well as enhancing my shading and lighting skills. My primary challenge was to reach lifelike details”

Shubham Mehta,
Raspberry, 2017

“I was looking for something different – a character that wasn’t fictional, that felt real and had a story, and that also from an aesthetic point of view wasn’t a typical, big-muscled character we do so often as digital artists. A photograph by Joey Lawrence really captivated me and it was what I was looking for at the time”

Aldo Martinez Calzadilla,
Aghori Portrait, 2017



Aldo M Calzadilla
[facebook.com/AldoKromnzArt](https://www.facebook.com/AldoKromnzArt)

Born in Cuba, Aldo is a modeller and concept artist doing visual effects for the film industry

Software ZBrush, Maya, Mari, Photoshop

Work in progress...



“This was inspired by the Sphinxes from The NeverEnding Story, which guarded the gates to the Southern Oracle. I wanted to create two large sentries with an ominous feel, while standing motionless. The Triforce element from The Legend Of Zelda came into play with the glowing triangles, but in a darker, sacred geometric approach.”

Mauricio Ruiz,
Objects of Reverence, 2017



Mauricio Ruiz
mauricioruizdesign.com

Mauricio is a concept artist and character designer for feature films, television and games

Software ZBrush, KeyShot, Photoshop

Work in progress...





Aron Kamolz
aronk.artstation.com

Aron is a self-taught 3D artist/
generalist, with a focus on
building digital landscapes

Software VUE Infinite 2016,
Photoshop

Work in progress...




“I saw a similar photo
of such a place on the
web and was motivated
to rebuild it in VUE
Infinite. I also wanted to
test a cliff/rock
displacement function
I’ve set up together
with a believable
plant distribution”

Aron Kamolz,
Zen Shrine, 2017







“As a collector of props and steampunk-related items, and as a graphic designer trying to learn more about 3D modelling for concept art, I decided to make a fictional astronomical device based on astrolabes and orreries, mixed with elements from steampunk culture and focused on making it look functional”

Davison Carvalho,
Steampunk Orrery-Astrolabe, 2016



Davison Carvalho
hellodave.co

Davison is a self-taught artist, working as a production designer and concept artist

Software Modo, Illustrator, Photoshop, Houdini

Work in progress...

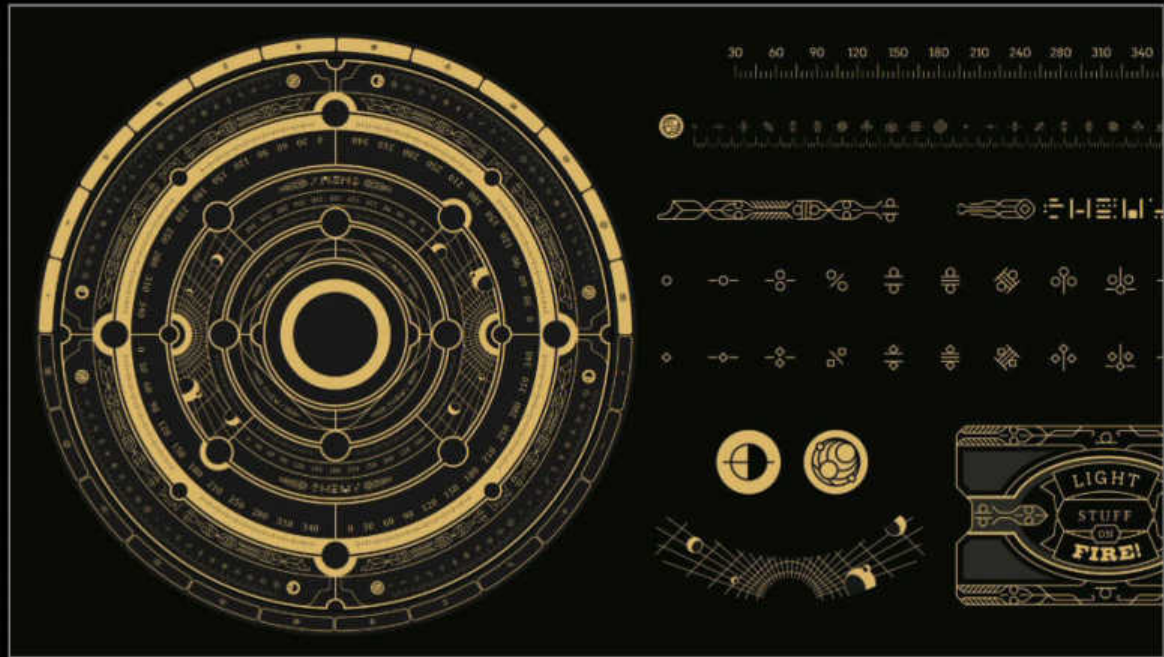


“With a fixed two-day timeframe set for everything including render time, my core goal was to achieve some level of realism on the renders, composition, light and the design itself. That’s why I chose to make the steampunk mechanical parts true to its roots – no sci-fi glowing lights and energy, just indications of steam power”

Davison Carvalho,
Steampunk Orrery-Astrolabe, 2016

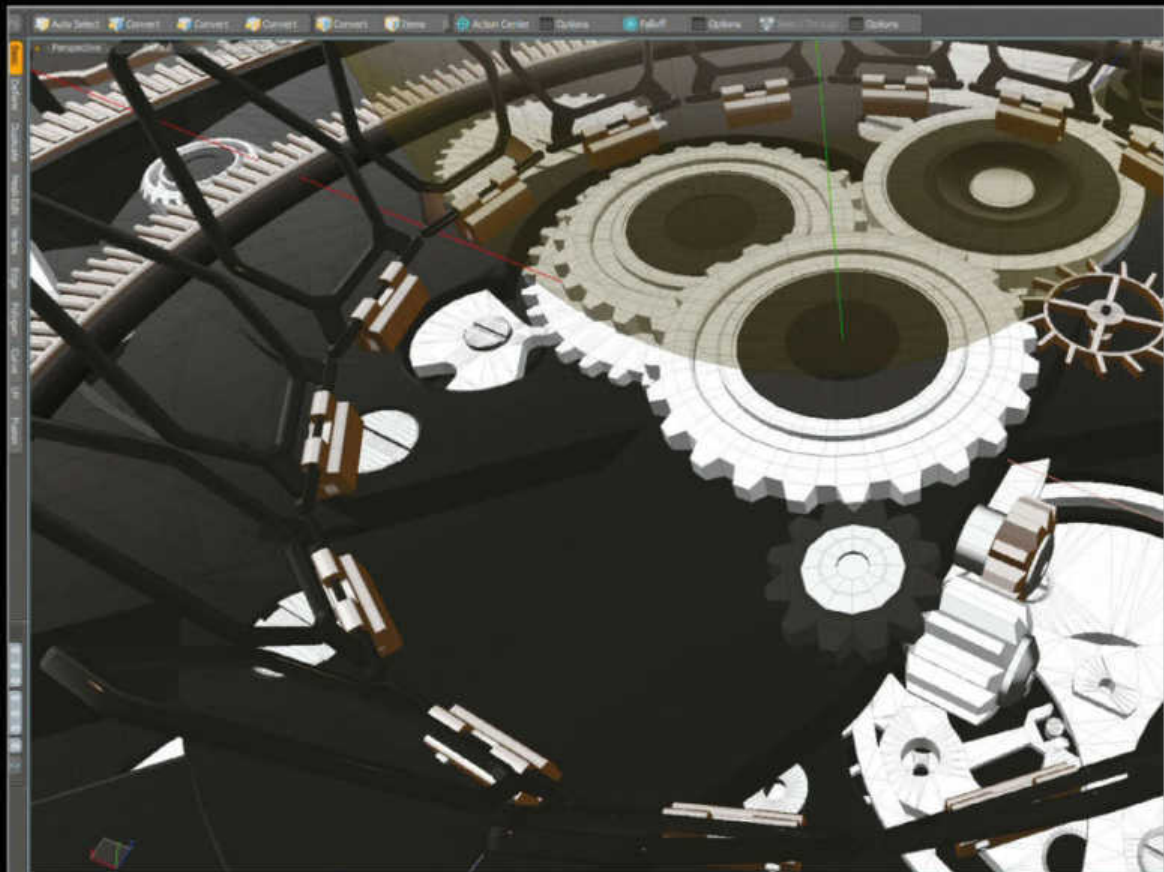
BLOCK IN

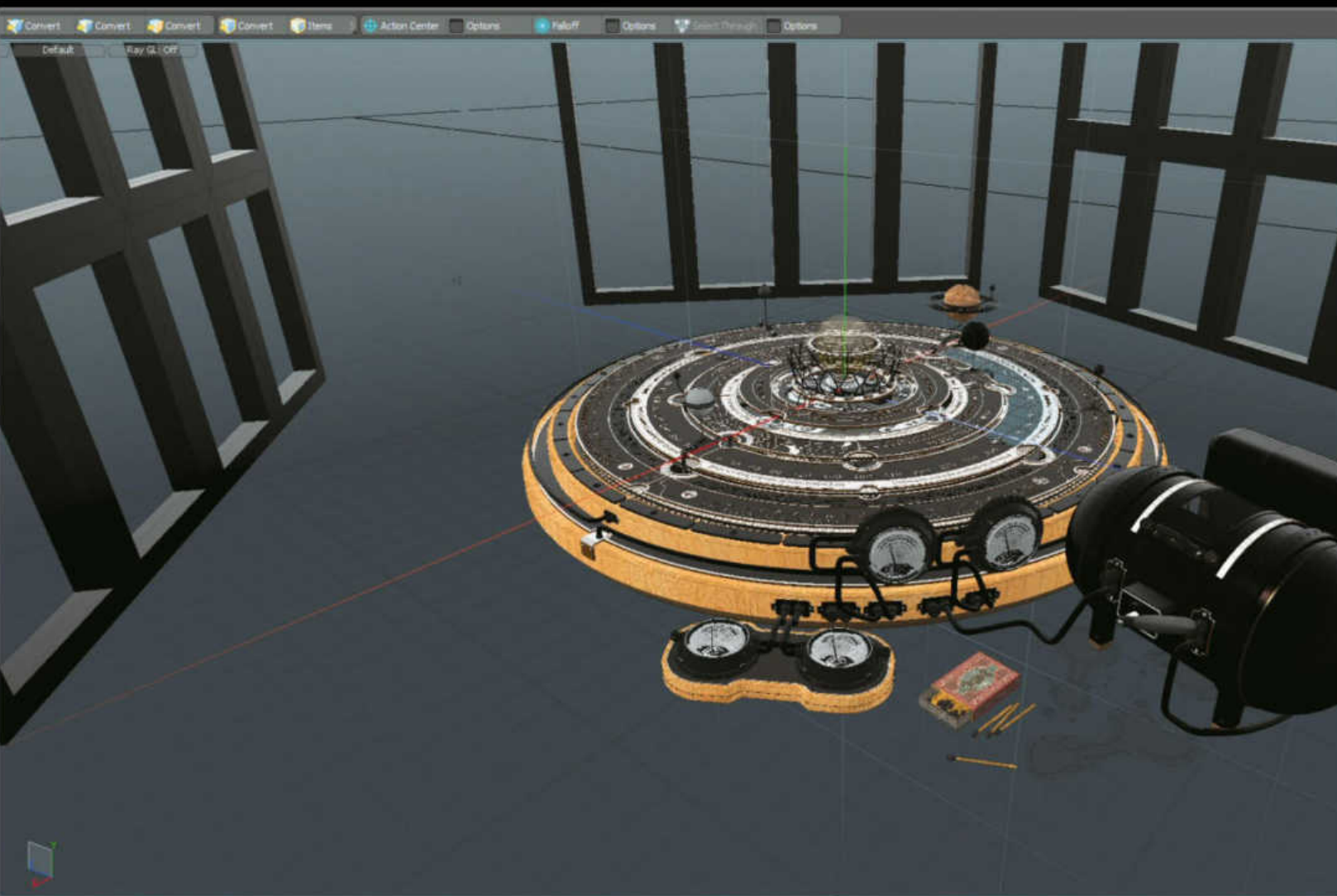
RIGHT I usually block or draw elements directly on canvas or in the software I’m using, but drawing all these thin lines directly in Modo was too time consuming, so in order to save time I designed the basic line structure in Illustrator and exported to Modo.



EMBRACE REFERENCES

RIGHT To make it look a bit less fictional and more functional, I made several sketches by hand to mimic how different types of gears rotate together, watched some videos of clock mechanisms in the making, and blocked some meshes in 3D in order to test to look of it.





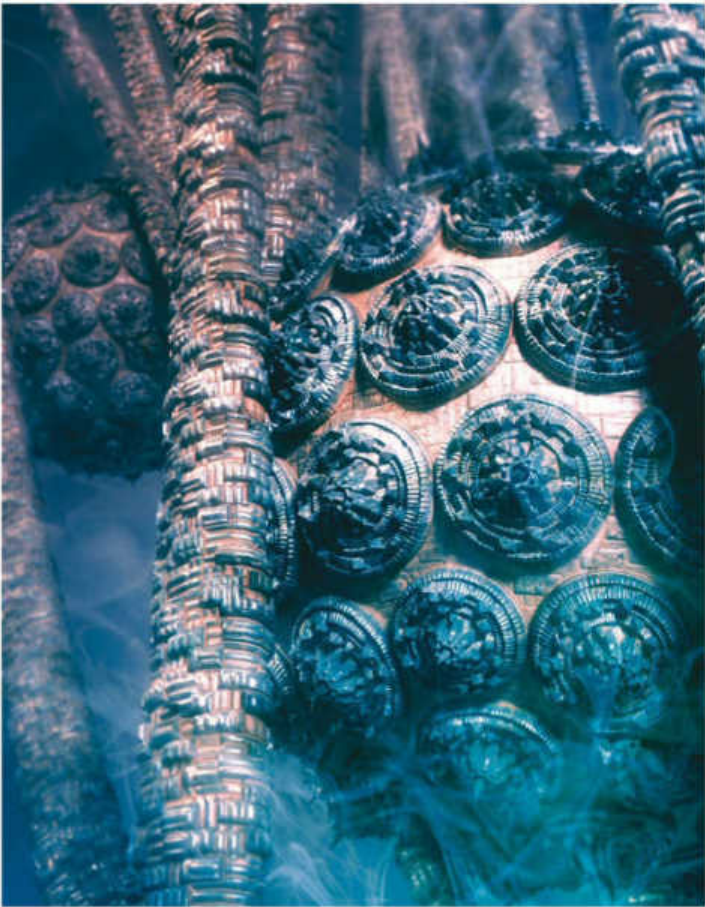
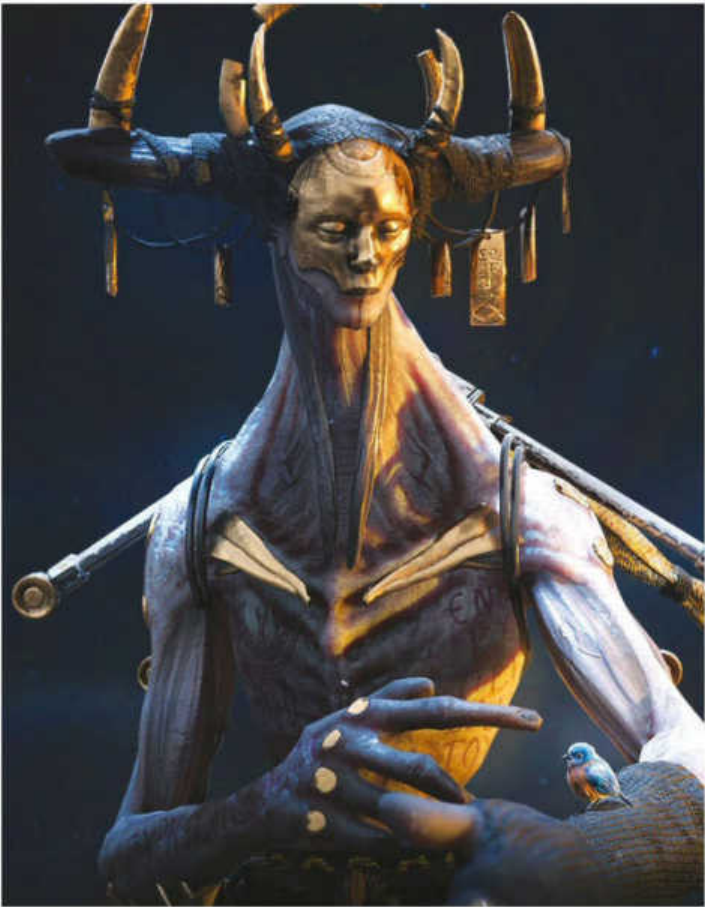
LIGHT THE SCENE

ABOVE To get better lighting and photography with all those reflective surfaces, it was essential to place geometry, lights and a textured Spherical map to get better renders. I placed a mesh of a window with area lights behind it to get nice and smooth shadows and reflections.



ADD ATMOSPHERE

LEFT Close-up shots of heavily lit objects tend to have a lot of air particles and dust, especially in beams of light. To achieve this look, I rendered some silver reflective particles with Camera Depth and Motion Blur in Houdini and hand-painted the rest in Photoshop.





THIS IS SUBSTANCE

How much do you know about the exciting suite of PBR tools invigorating the world of 3D? Leading games artists tell us all about how Substance has boosted their workflows

Allegorithmic has had something of an astronomical rise in popularity in the last few years with its Substance tools. Switch on a games console and you'll very likely find yourself in an awe-inspiring realistic environment talking to highly detailed characters, all textured using Substance. Of these, the most notable is Allegorithmic's flagship product, Substance Designer, which is now the industry standard in games for PBR material authoring. Substance Painter, its sister tool for PBR and particle painting, followed in 2014.

Since then, Substance has been used across studios for animation and VFX work including Framestore, Blur Studio, MPC, Fox and Digital Domain, as well as triple-A games including *Uncharted 4*, *Forza Horizon 3*, *Watch Dogs 2* and *Call Of Duty: Black Ops III*.

Some of the artists working on these kinds of bestselling games have been making the transition to Substance in the last year or two from other applications. "I decided to try it out since everyone seemed to be transitioning to it," explains Natalia P Gutiérrez, character artist at Creative Assembly, of why she made the move from Mari and Quixel SUITE. "The software was getting famous and I wanted to know why! I kept using it because once you get used to it, it's very comfortable... I now prefer to leave my models a little less detailed when sculpting and just paint the detail in Painter later, since this allows me to see the final result more directly."

"If you have any sort of experience with traditional texturing or 3D modelling packages, it's so easy to get into," says Billy Matjuniis, lead artist at Ubisoft Toronto. Matjuniis mainly uses

Substance Painter and Designer but has also experimented with every single tool in the suite. At Ubisoft Toronto, he says, the Substance tools are used every day, and he personally switched over to Designer and Painter from ZBrush and Photoshop/Quixel. "Designer is used for most of the base materials we build for games, where we then use Painter to generate custom masks that will then blend our tileables onto structures and props. We use Substance Painter as well for some of our completely unique assets."

The move from Photoshop to Substance Painter was a sentiment repeated by other games artists we spoke to, including Magdalena Dadela, senior character artist at Eidos-Montréal who has also almost entirely replaced Photoshop with Substance Painter in her character workflow. "Previously I used ZBrush and Photoshop for projections and Mudbox mostly for painting directly on the model. I liked Mudbox's connectivity to Photoshop so it was making life easy to project images or use photo textures. With Substance Painter materials, however, I can produce the same if not better effects."

"I will still use ZBrush from time to time in conjunction with Photoshop for photo projections if there's a need for it, but 90 per cent of the time I'll use Substance Painter... It has substantially sped up my workflow. I can get really nice-looking textures in a matter of hours rather than weeks. Obviously it takes a whole lot longer to polish them, but the base is fast and the iteration process is easy. I love that a change in UVs doesn't destroy

“It has substantially sped up my workflow. I can get really nice-looking textures in a matter of hours”

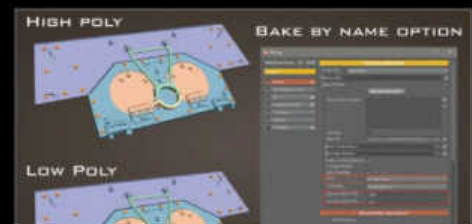
Magdalena Dadela,
senior character artist



Goblin by Magdalena Dadela

BAKE AND TEXTURE A COMPLEX MODEL

Piotr Bieryt shows you how to speed up baking maps and create textures using Substance Painter



01 Prepare model for baking Instead of 'exploding' the model for baking, we can use the baking-by-names feature inside of Painter. Simply alter the Match setting. However, this feature requires the proper naming of our objects (see image). Objects with the same colour have the same name, but with added suffixes: '_low' for low poly and '_high' for high poly.



Trade by Songjie Li

“The amount of extra precise control curves give you over your contours and bevels is very welcome”

Mark Foreman,
senior environment artist

days of work, and that you can update your model easily in Substance Painter and it will still transfer your texture onto it with little to no loss. The variety of materials and masks adds tremendous freedom. Also the scalability of the texture resolution is a huge bonus.”

“Substance Painter is a great innovation for the texture process of painting,” says Songjie Li, 3D artist at Tencent, who says that with Painter he can create a good overall effect from the beginning to the very end. “If it is PBR work, most of my work is finished by Substance because the textures look great in a game engine... Substance Painter provides a more direct effect for me.”

Similarly, Mark Foreman, who is a senior environment artist at CD Projekt RED, explains that he made the jump to Designer from Photoshop: “I noticed I was employing many techniques in Photoshop similar to the procedural workflow that Designer excels at. I had been using things such as gradient maps and various filters similar to nodes present in Designer, along with height and normal information from 3D programs to create my textures. This similarity made the transition rather painless.”

A beta user for Substance Designer 6, Foreman has been really excited about some of the features added to the latest release, like the curve node. “I used curves extensively in my recent Rose Window piece, where it was invaluable for creating the architectural details. The amount of extra precise control curves give you over your contours and bevels is very welcome. I can see



02 Split the model (texture sets) I had to split my model into several 4K texture sets, because I needed high quality. I've achieved this by assigning different materials in Blender for each part of the tank. If the dividing line went through the same object, then I had to adjust masks (dirt, scratches) by hand (see example image). In total, I used seven texture sets.



03 Texture layers of materials As you can see, the whole material for the hull is divided into four major folders with layers. For blending I mostly used MG Mask Builder with Paint over it for better control. I only used a few materials but combined these with different colours and properties.



04 Create painted strips and signs I painted white stripes on the turret using the standard brush in orthographic view. For leaks I used the Smudge tool and textures as stencils. It's good to add a Sharpen filter to these layers to make the paint more natural and realistic. You can add nice jagged edges and scratches to stripes using the Smudge brush with high hardness combined with MG Mask Builder.

SUBSTANCE BREAKDOWN OF A UE4 SCENE

Otto Ostera tells us how he used Substance Designer and Painter for *Assault on Pyongyang*

PROCEDURAL BRICK TEXTURE

The main challenge was to catch interesting reflections. Having control in my graph over the size, rotation and other parameters with instant results makes me keep choosing Substance Designer for creating my tileable textures.

TEXTURING VEGETATION

Substance Painter can be a very strong tool for vegetation texturing. Using only fill layers and Smart Masks I was able to achieve realistic results in the plants' maps. All alpha work was also tackled in Painter.

PROCEDURAL MUD TEXTURE

Fully created with Substance Designer, this mud texture was core in giving a wild and wet feeling to this piece. The Water Level filter made adding the puddles to the texture easy and gave me amazing results on the spot.

OLD GAS PUMP

Texturing all props in Substance Painter allowed me to have easy control over things like rust, overall weathering and ageing details on the spot. So when I decided that it would be raining I re-textured all my props in a matter of hours. A super-powerful tool.

curves becoming a staple of my future work. The text node is also a nice addition to have, as it removes the need to nip back to Photoshop to create or update text elements."

Since he started using Designer in mid-2016, Foreman has noticed a change in his workflow processes. "My workflow has become a lot more focused, decreasing the time needed to finish a material. Before, I found myself hopping between various applications, which often put awkward pauses in work, waiting for an application to load or something to bake. Now, I rarely leave Designer in the creation of a material. I'm also a lot more experimental; I try different shapes by just tweaking a few values at any time, even at the end of working on a material – compared to working with a sculpt, where I'd have to commit to the underlying shape past a certain point."

Matjiunis says that the use of Substance has streamlined workflows a lot more: "It's become almost like a centre point for all my tools. Everything funnels through Substance before going into the engine."

Heber Alvarado, senior character artist at Bungie (Seattle), points to the real-time viewport, which has been a game-changing feature for saving on iteration time. "The speed and intuitiveness you get while painting real-time on your model is something that you do not get outside of Substance." The tools have completely changed Alvarado's workflow: "I used to spend lots of time flipping back and forth between my textures and the game engines, trying to get closer to the look I had in my head. Substance

“Being able to paint across all my channels is extremely powerful, while also being able to edit each individually”

Heber Alvarado,
senior character artist

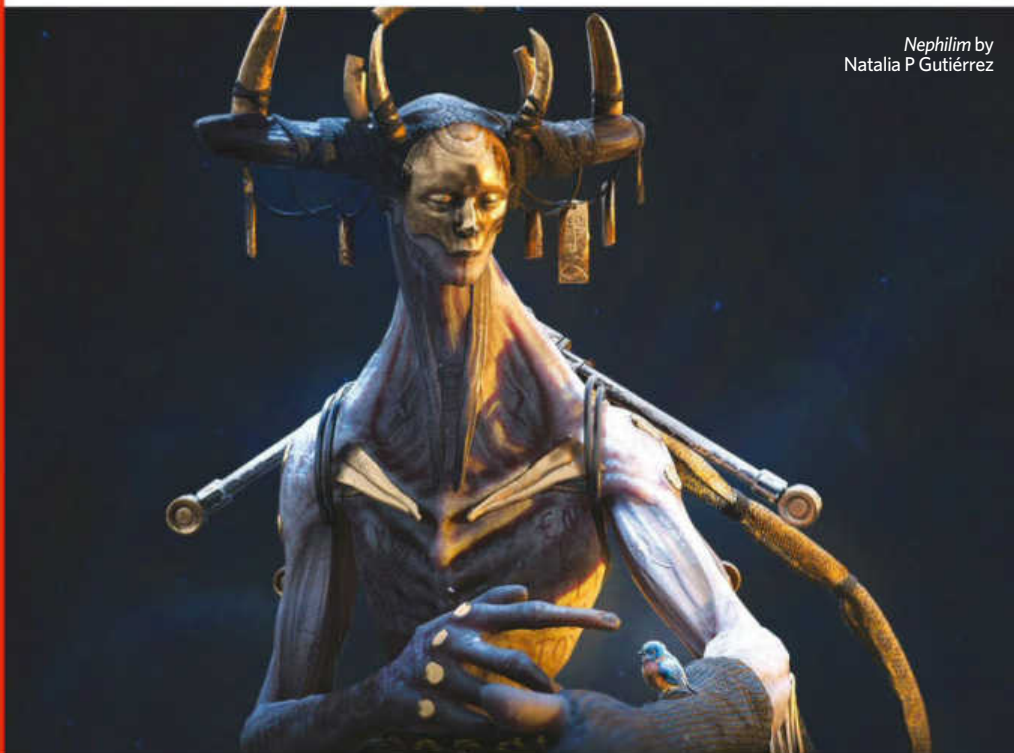
made this process a lot more artist friendly by facilitating the iteration time, since you are essentially always working towards your desired look. You are not tweaking arbitrary values to get your surface to appear the way you want, but you are editing the material in real time in a viewport much like most modern game engines.

"Being able to paint across all my channels (height, normals, roughness) is extremely powerful, while also being able to edit each channel individually," says Alvarado. "It also removes a lot of the mystery about what your maps are doing since you have that instant feedback right in your editor. Being able to paint at a lower resolution and output at a higher resolution is also extremely useful when you need to make iterations and revisit older work."

One slight caveat of the ability to work on every channel at once is that users would need to familiarise themselves with the process. "The downside is that you need to get used to this first, which can be a bit challenging, but once you do so you won't want to go back," admits Gutiérrez,



Rose Window
by Mark Foreman



Nephilim by
Natalia P Gutiérrez

“You can quickly pump out multiple variations of a material with the adjustment of a few sliders”

Billy Matjuniis,
lead artist

although she says that the tools are very intuitive for beginners. “I’d recommend watching tutorials and just enjoy the process of texturing. I believe Allegorithmic has a very complete YouTube channel with lots of tutorials, so my recommendation would be to start from there!”

“When figuring out how things work in Substance Painter, just grab a Smart Material that is already in Substance Painter and deconstruct it,” advises Dadela. “Try to figure out how it works and it’ll make it easier for you to create your own in the future. Don’t just mindlessly apply materials and use default settings either. Always try to understand what is happening under the hood. Very often you’ll need a few tools to achieve great results, so don’t stack multiple Smart Materials on top of each other. It’ll create heavy scenes and noisy results.”

Once you’re used to Substance, you can start trusting the suite to do it all, says Matjuniis. “It’s probably a good idea to get comfortable with letting Substance do a lot of the finishing work for you. Most or all of your micro detail can be layered in Designer or Painter, and it’s completely non-destructive. If you need to scale back on the grunge or the damage, it’s much easier to do so than having to go back to your high poly/sculpt and make those changes. It’s great in production when you can quickly pump out multiple variations of a material with the adjustment of a few sliders and parameters. Once you get used to



Thornton Pickard
Imperial Triple
Extension Camera
by Billy Matjuniis

“One of the main things I like is how it really feels like Allegorithmic listens to its community”

Billy Matjiunis,
lead artist

working like that, Substance really becomes a part of pretty much everything you do.”

The next level then, says Foreman, is to start playing around. “I’d recommend experimenting whenever possible. The thing that both Designer and Painter really have going for them is their flexibility. You can very quickly iterate or try alternative ideas in your work. Especially in Designer, where there are many routes to similar results. I really enjoy combining nodes in new ways in my personal work. Often I have found new quicker and simpler alternatives to my old methods, or sometimes an unexpected result provides great inspiration!”

And of features that he’d love to see implemented in Substance in the future, Foreman says that simple mesh tools to help grab height information from imported meshes is at the top of his list. “Right now you have to render these to textures in your 3D software and then import those textures to Substance. If you later want to change the placement of elements in those textures, you have to swap back to your 3D software. A way to scatter simple mesh shapes inside Designer would make tweaking materials

using external height information easier and more flexible.”

“There are a few things that I’d still love to see in Substance Painter,” says Dadela on how she thinks the tool can be improved. “One of them is a real SSS shader for skin texturing that would resemble what we have in Marmoset Toolbag. Another is a transform tool, especially one that would work with the projection tool for easy image adjustments and distortions. This would make face projections, for example, super simple... It would also be great to be able to transform the mask elements like in Photoshop: select a piece of the mask and move it around.”

Alvarado, on the other hand, would like to see some additional rendering features, “I would love to see the lighting and rendering options expanded a little further: custom lighting rigs, screen space effects and so on.”

“It would be great if someday there could be a merge of Designer and Painter into one package,” says Matjiunis of what he would like to see in the future. “Maybe even a ‘light’ version of Painter incorporated into Designer.

“One of the main things I like about using the toolset is how it really feels like Allegorithmic listens to its community and partners,” says Matjiunis. “It seems like they really have a grasp on where the industry is going and are always there with great updates that give us exactly what we need at that moment. Their community developers are also super active on forums and through social media and are always there to answer questions and/or troubleshoot issues.”

And who knows, some of the ideas listed here may one day end up in the Substance tools release notes. Watch this space!

PROCEDURAL ABSTRACT MATERIALS

Naughty Dog texture artist Rogelio Olguin tells us how he created his Beautiful Algorithms series

How did you come up with the Beautiful Algorithms series?

This series came out of having an artistic slump. I always have side projects at home and I did not really have time for a huge project, so I chose to do abstract tests within Designer and rendered in Iray. I was really satisfied with the first few ones and I kept going on. Really, for me personally the idea behind Beautiful Algorithms was to explore forms. It was just an exploration of what else I could do with Designer, but also to not be trapped to conventions of accuracy and just free myself from the grind of making a surface feel representative of a real-life material – and just explore new possibilities. After I did a couple of these abstract materials I started seeing others inspired in the community. In general I learned to play with nodes in Substance I did not use before, and was also a way to get out of an art slump.

What do you like about procedural texturing?

I think the greatest joy is how by mixing all these recipes together in Designer via node structures you can arrive with many different results. Procedural texturing is honestly the future and I can see this expanding further easily. Designer was not the first to have procedural texturing possible, but Designer made it intuitive and simple enough to use.

Can you run through your workflow for creating a texture in the series and how you used Substance Designer?

In all the textures for the series the major thing was to arrive quickly to the main forms, and everything else was just filler. In general I kept the graphs simple enough – nothing is overly complex. I also tried sticking with simple shapes. I got inspired by architectural patterns for some of the series’ textures. In general, my workflow was main forms first, add more detail with secondary forms, and finish it with a colour and material response. I would make simple models in Maya and bring them into Designer to have my materials placed onto render in Iray. Most individual materials were done in a span of two hours or less after work and I tried hard not to overthink it. If the material was not ending up how I liked it, I kept going instead of second guessing myself.

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THE BLUEPRINT FOR PERFECT MECHS

Master mechs with our top tips for engineering concepts, models, textures, lighting and more

No longer constrained to the imaginations of sci-fi authors and the toy trunks of young children, mechs have been bashing their way onto our screens in the last few decades. Known to the Japanese as mecha, the roots of these human-controlled robots lie in 2D and anime such as *Gundam*, though when you think of a mech nowadays you might imagine a giant, 3D humanoid or zoomorphic weaponised machine capable of total destruction.

We've feared the towering AT-ATs of *Star Wars* and gazed in wonder at the Jaegers trudging through oceans in *Pacific Rim*. We've taken down the world-threatening Metal Gears from the *Metal Gear* series and sat inside the comfort of our friendly companion Titan in *Titanfall*.

With the sheer quantity of meticulously designed mechs across a wide range of media, it's easy to get inspired. But the process of actually creating one yourself is more than simply clicking on a preferred modelling software and getting

started. Have you considered that you need to plan the form and shape of a mech first? Although mechs have still, largely, yet to translate to the real world from the fictional sphere, it's still essential to give your mech a sense of believability, that such a mechanical marvel could exist alongside us. Other than using real-world references, there are other ways to come up with better concepts. "My favourite mechs have a narrative," says Mathew O'Halloran, environment artist at Ubisoft Massive. "The overall design, texturing or environment can lead you to wonder: 'What's this mech's purpose? What has it been through?'. My favourite artist Vitaly Bulgarov does this so well with his designs. They always look so purposeful."

O'Halloran is just one of our favourite mech masters for this special guide, giving you top tips for adding more finesse to your machines. They've blueprinted everything from design and modelling to rendering and even VR, so you can create the ultimate weaponised mech for your next project.

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01 DESIGN WITH A PURPOSE

The best advice I can give about both design in general and specifically mech design is to ask yourself: "What is the mech's purpose?". Man-made products are usually designed to do one specific thing, and do it well. I try to come up with a very specific purpose to whatever it is I'm designing. Even if that purpose isn't apparent in the final design, it is helpful along the way.

Matt Tkocz

02 BUSY VS CALM

It's easy to oversaturate your mech designs with all the tools at your disposal, so one important idea to consider is controlling the first, second and third read. In my mech-ish design, I've created a really dense area of detail on the helmet, a little bit less into the chest and an increasingly lower amount everywhere else. This way, I control where you look first, second and so on. The calm areas are critical for the eye to rest and absorb the busy.

Mauricio Ruiz



Goliath - 1st Unit
by Ara Kermanikian



Wild mech
by Mathew
O'Halloran



Crawler mech
by Mathew
O'Halloran

03 DESIGN VIABLE ARTICULATION TO SUSPEND DISBELIEF

Accurate articulation is critical to a mech's believability and portrayal in stories. Design the overall shape, limbs and movable parts separately, taking into consideration all ranges and limitations of motion and stability. Consider how the limbs and movable parts are assembled and add necessary mechanical elements to represent the construction.

Ara Kermanikian

04 KEEP YOUR WORK BELIEVABLE

A good reference is key to a convincing design. When choosing my references for mech design I tend to pick objects that already exist in real life. This way it is easier to create authenticity, which then gives a realistic feel to the final product.

Oskar Woinski

05 RELATING WITH HUMAN-RELATIVE SCALE

Our perception of imaginary elements such as mechs or dragons are from a human vantage point. Adding helper objects of human-scale relatable elements during your creation process and especially in your final composition helps suspension of disbelief, and establishes our perception of the mechs in our own world.

Ara Kermanikian

06 START LOW POLY

The main tip I can give someone who is starting to use ZBrush is to work with a low amount of polygons, hard surface or not. It is very common to see beginners trying to make the mesh very smooth by increasing the poly count, but this only hinders the process. Always think about the structure and the silhouette of the character.

André Castro

07 HARD-SURFACE MODELLING

Among the large selection of tools out there, I find ZBrush to be the most satisfying one for my needs. Since I create mainly concepts, I usually start with relatively high-polygon meshes and sculpt the base until I get a pleasing result. In order to create a human-like mech I tend to use basic male or female meshes as my base, as this way I don't need to worry about basic proportions.

Oskar Woinski

08 DECREASE MODELLING TIME

It's important to try and keep your modelling time down, as it's easier to maintain excitement and motivation over a shorter project. To do this I rely heavily on Modo's Rounded Edge shader - this way I get to avoid bevels and control loops while the shader makes everything look like it's been fused together. This also means that I can use Booleans and N-gons all over the place.

Mathew O'Halloran

09 HELPER OBJECTS FOR MECHANICAL JOINTS

Most mechs have hinge, pivot, ball, saddle or universal joints to articulate motion in their limbs and attachments. Adding helper objects such as cylinders for hinge joints or spheres for ball joints can help identify centres of motion and assist in posing the mech to convey compelling vantage points.

Ara Kermanikian

10 MATERIAL PLANNING

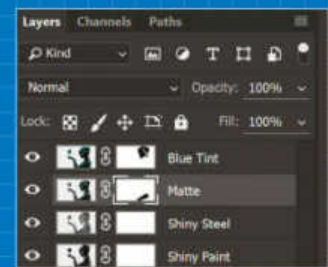
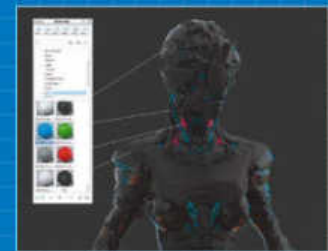
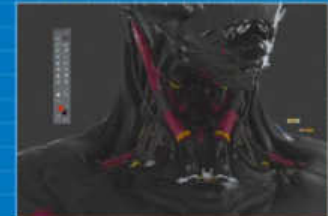
I split the model in different subtools inside ZBrush before exporting it to KeyShot. This way it is much easier to plan and visualise the materials and the design.

André Castro

11 PROCEDURAL MATERIALS

As a concept artist, I like to move fast. UVs and traditional texturing are way too tedious. I mostly rely on procedurally generated materials. A few occlusion layers for weathering, rust and dirt and some noise layers to define material roughness usually get me 80 per cent of the way. Detailing, decals and parting lines are usually done in Photoshop afterwards.

Matt Tkocz



Unusual friendship
by Oskar Woinski





12 BALANCING TEXTURES AND MATERIALS

After creating a massive amount of mechanical parts, it can get overwhelming assigning materials and maintaining a balanced composition of texture. My suggestion is to focus on three or four main materials or textures for the majority of the parts. This way, you can generally place alternating materials side by side to draw out the forms better and when several parts come together all in one area, you can still maintain separation without getting too busy.

Mauricio Ruiz

12



13 DETAIL RATIO

A great concept artist once told me that the trick to good mechanical art is to stick to a 30/70 detail ratio; creating focal points with 30 per cent complex detailing and 70 per cent areas of rest helps to create an overall composition within your mech's design.

Mathew O'Halloran

14 RIM LIGHT 90 PER CENT OF THE TIME

When it comes to lighting your model, rim lighting is an extremely useful tool. Not only is it cinematic in presentation, but it helps to describe the forms of your design more clearly. Rim lights are almost always useful unless the goal of the lighting is to obscure and mystify the figure's silhouette or emphasise self-lighting.

Mauricio Ruiz

15 USE HDRI

Recently I have begun to lean on image-based lighting much more heavily, as my lighting skills leave a lot to be desired. Through Modo, KeyShot or Marmoset Toolbag I've had great results using HDR images in order to generate a realistic lighting scenario for my mechs, and this method can be used for both real-time or offline rendering methods.

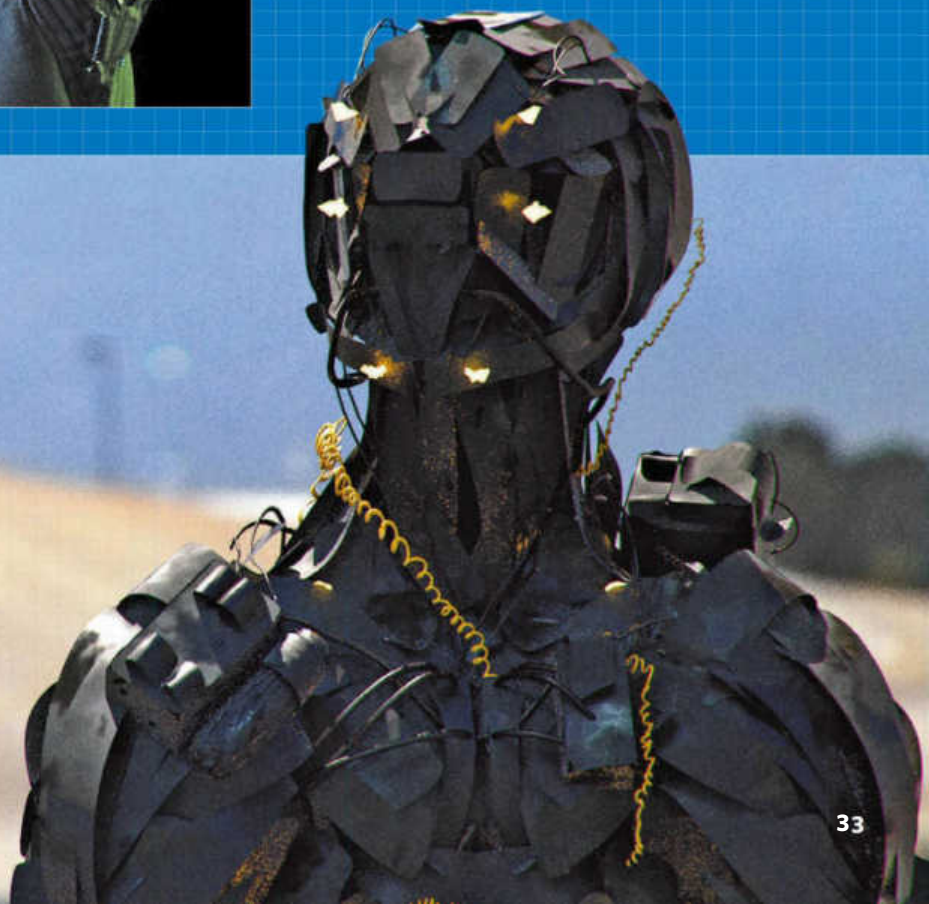
Mathew O'Halloran

EXPLORE MECH DESIGNS IN VR

Should you be creating mechs in Oculus Medium and Google Tilt Brush?

The currently available 3D apps for VR are still pretty limited, which is simultaneously the beauty as well as the downfall of working in VR. The absence of serious modelling tools forces you to move fast and not look back. As a result you can crank out dozens of concept models in minutes. But at the same time, creating proper 3D assets is pretty much impossible with the currently available software. Therefore, I treat VR sculpting primarily as a sketching and ideation tool.

Matt Tkocz





“The best advice I can give about mech design is to ask yourself: ‘What is the mech’s purpose?’”

16 LIGHTING WITH AN ENVIRONMENT MAP

Unless I need something in particular, lighting my scene with an environment map will usually give me the most bang for my buck. Occasionally I will place one or two rim lights if the subject doesn’t pop off the background enough. The hardest part about pulling off a realistic render with an environment map is the contact point. The weakest link of a render is usually where the feet of the mech meet the shadow catcher, but I’m not shamed to take the coward’s way out whenever I can get away with it and just crop the feet out.

Matt Tkocz

17 QUICK ACCENT LIGHTING IN KEYSHOT

For those who are just getting the hang of doing lighting in KeyShot, there’s one really quick way of throwing lights on your model without having to overthink where the light source needs to be. You simply have to create simple floating spheres and apply Area or Emissive lights on them once in KeyShot. Then, just make sure that you uncheck Visible to Camera. If you want to create even more subtle lighting, you can always utilise the Power slider above, which has a drop-down menu selected as Watts and you can change this to Lumens.

Mauricio Ruiz



18 FRAMING

A crucial but overlooked aspect of rendering is designing the shot itself. You don’t want to waste all those hours of blood, sweat and tears by neglecting the presentation. Carefully pick your angles, focal length and f-stop to get the most out of your design. Creating a 2D representation that does your 3D model justice can be a challenge in itself, so I don’t take it lightly.

Matt Tkocz

19 RENDER

I always render from three to ten passes in KeyShot and then I make the composition in Photoshop. Depending on the project there is no need for one pass to be perfect, but the lights must have logic.

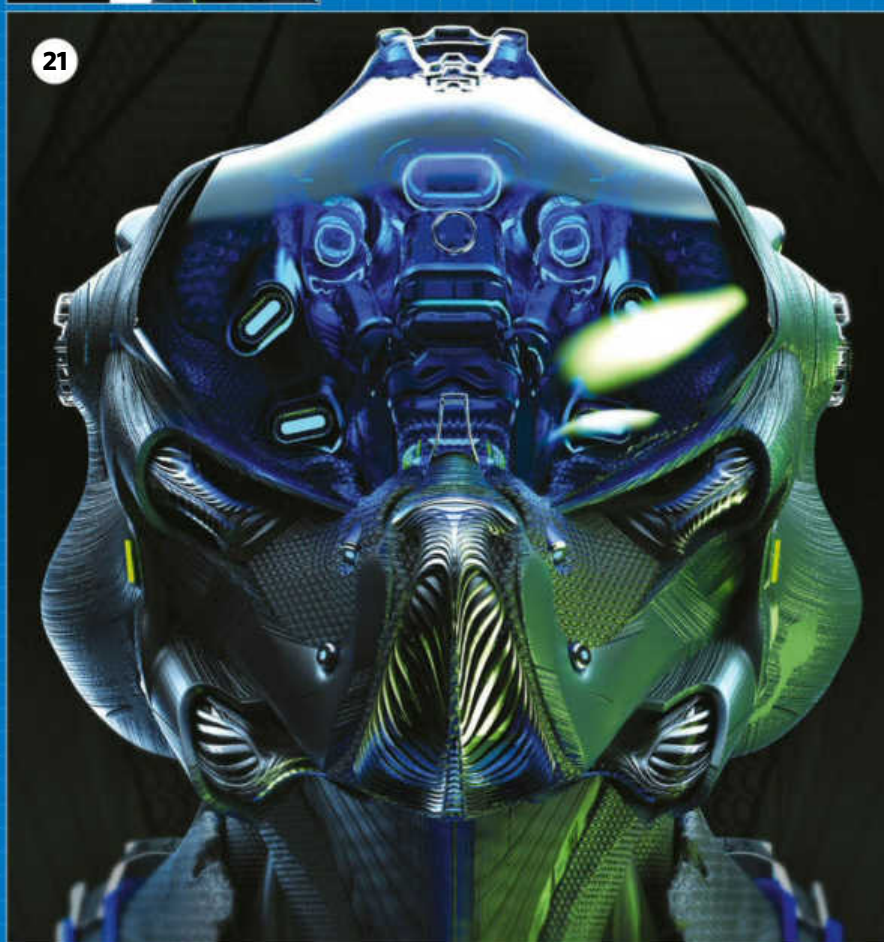
André Castro

20 ADD CHROMATIC ABERRATION

Once my mech is built I like to add a small amount of chromatic aberration around the fringes of the model in order to simulate a real lens. I also like to add depth of field to give the mech a sense of scale and also a small amount of lens dirt or particles in the air. Presentation is key.

Mathew O’Halloran

21



21 PRESERVING KEYSHOT RENDER DETAILS IN POST

Sometimes KeyShot will soften the details you’ve spent a lot of time creating and this is a way to get it back after render. In Photoshop, open the render as a separate file, as this process flattens layers. Go to Image>Adjustments>HDR Toning. From there, reduce the Edge Glow Radius, increase Strength, Detail, Shadow and Highlight. Drop Saturation to -100%. When complete, apply this layer as a Multiply layer (or other Layer Blending Mode) on your Final Image. Adjust Transparency and Erase/Mask as needed.

Mauricio Ruiz



BEHIND THE SCENES AT ZERO VFX

The master of invisible visual effects discusses its latest work and expansion to the West Coast

Leading visual effects and creative studio Zero VFX was founded in 2010 by industry veterans Brian Drewes and Sean Devereaux in a Boston basement. "We came together at exactly the right time for the amount of knowledge we both had in the industry," explains Devereaux. "We knew what worked in the industry and what didn't, and I think we had a clear vision of what we wanted to build. It was the perfect timing for everything and I think that's why we are still around today. We started a company at a time when VFX companies were going out of business. Using knowledge of all the places we worked, we [built] a place that could handle the ebbs and flows, while maintaining a strong artist base, a producer base and do great work. I think that's what it came down to."





"We're across the street from Snapchat and currently engaged on projects with them - it's definitely one of the reasons we moved to LA," says co-founder, Brian Drewes



Today, Zero VFX employs 80 people across two offices, having just established a new facility on the West Coast of the United States. Recent feature film work from Zero VFX includes *The Magnificent Seven*, *Hardcore Henry*, *Ghostbusters*, *Patriots Day* and Oscar-nominated *Fences*. "There are a ton of ad agencies in LA, and that was one of the main considerations with putting a footprint," explains Drewes. "Pretty much every production company has an office there, so a lot of work gets produced out of LA, and to boot there's a growing hi-tech industry. We haven't actually gone out and aggressively marketed ourselves into the LA advertising community. Right now we're focusing that office specifically on features. It's in the next six to eight months that our plans have us really building out and really engaging the full commercial pipeline through that facility."

For *The Magnificent Seven*, Zero VFX had responsibility for around 900 shots, with around 100 being set extension work where it was a fully



“We knew what worked in the industry, and I think we had a clear vision of what we wanted to build”

Sean Devereaux,
Co-founder

digital environment. "It was a unique challenge," Devereaux begins, "because Santa Fe has a very different look to Louisiana, and vice versa, where Louisiana is full of lush vegetation and no mountains; everything is very flat. Santa Fe has minimal vegetation, but everything is majestic. Everywhere you turn is a mountain or something that breaks horizon."

"To combine these two things, we spent months and months trying to find the right balance between the majestic mountains of Santa Fe but cover them with the vegetation from Louisiana, and vice versa." This led them to study every type of vegetation Louisiana has and every type of rock face you can find in Santa Fe. "Once we had an answer we were able to proceduralise it and make it a gizmo that allowed us to quickly plug it into our shots and [make] everything geographically correct so we could get the shots very quickly. Because of all the development time, as far as understanding the challenge of making sure that the work isn't only beautiful but to



BEFORE



AFTER

Zero's work on *Magnificent Seven* included explosions, set extensions and blood squibs



BEFORE



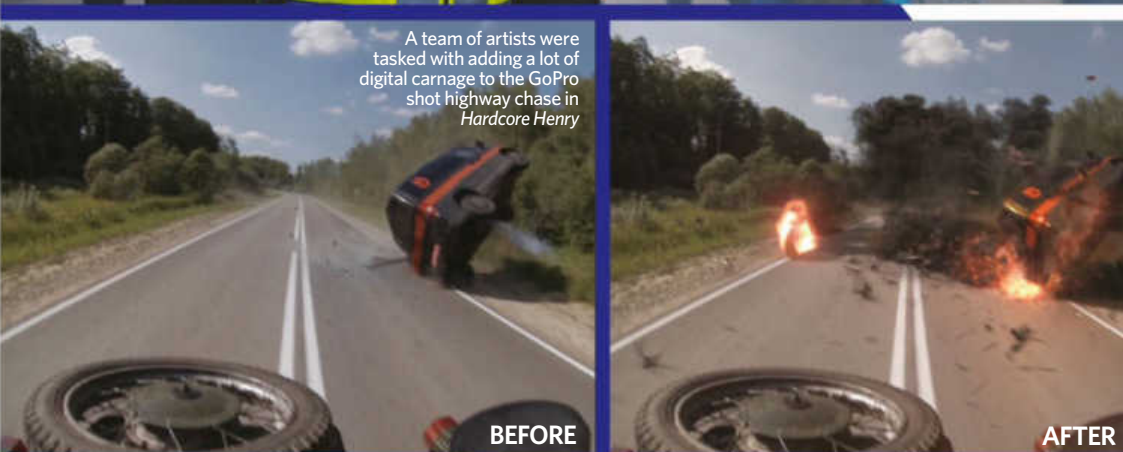
AFTER

Zero VFX had to develop a whole new character pipeline for its work on *Ghostbusters*

Boylston Street was rebuilt from a set with a green screen for *Patriots Day*



Typical of Zero VFX's portfolio, *Patriots Day* also had ample set extensions and invisible VFX



A team of artists were tasked with adding a lot of digital carnage to the GoPro shot highway chase in *Hardcore Henry*

achieve the story continuity points, the tools we created allowed [us] to track that. So we're not looking at shots and every single time we see a shot, we're like 'Oh the mountain should go further left or further right', [but in reality] we knew right away that it was correct. That was a big part about proceduralising the tools, so the artist could be creative and not worried about 'is something too far to the right or too far to the left' - that was a big part of that."

The remarkable increase in the volume of look development work that was required for *The Magnificent Seven* has since become a mainstay in Zero VFX's production pipeline. "I can't say what it was about that project that started it, except that there were some people we were able to hire to bring that added benefit to the team, which has been huge. Since that film we've worked on four or five films, but now we can't imagine not doing the amount of lookdev that we did for *Magnificent Seven* on other shows! I feel like it was probably a natural growth as part of our studio - we're at a size now where we need art directors that are going to need to be able to create looks before we actually worry about execution. That's been a big

part of every film since, as now each has had a pretty substantial lookdev phase. *Ghostbusters* was a huge one for that too. We started photoreal, but then it went very far away from what the limits of a typical photoreality would be with a ghost and apparition, and the smoke, sparks and electricity that came off. They require time to create and [you can't] worry about the execution because when you do that, [you limit yourself creatively]."

The recent reboot of *Ghostbusters* posed a different set of challenges for the studio to deal with. In particular, the ghost sequence was extremely complex, requiring the generation of a full character pipeline to put into practice. "It definitely was a departure for us," Drewes confirms. "The ghost itself was an apparition that doesn't appear in real life, right? We didn't even bother making the smoke first. What we did was create a CG guy and lit him to match the person that was shot on set. [To start off] with this character [we said], 'let's make him real. Let's make him a real person. Then let's start adding this stuff, let's start adding the skeleton, let's start adding the smoke, let's start adding all these



TOOLS OF THE TRADE

To properly create you need the right tools, and if they don't exist, develop them

To deliver its astonishing visual effects work, Zero VFX uses its own bespoke software in concert with off-the-shelf tools such as Maya, Houdini, SynthEyes, 3DEqualizer and PFTrack. Shotgun is used for underpinning the production pipeline. "Photoshop is a personal favourite of mine," reveals Devereaux. "I get to spend almost all my day on it, which I love. Avid, editorial systems we use, and Flame from Autodesk we use heavily."

Nuke was heavily involved in post-production for *Ghostbusters*, explains Drewes. "We used it for literally every shot; every single shot that goes through our facility for features goes through Nuke in one way or another. It definitely was a cornerstone for creating that look and balancing all the elements for the ghost. I think there were 90-odd passes, different bits for the ghost that all needed to get dialled in on a shot-to-shot basis between interactive light and swirling vapour, and all the little body bits and internal skeleton. That all needed to get balanced very carefully. We created some great tools to help us ingest and help us get all those elements in a procedural and predictable manner, so that when an artist picks up a shot, many of those pieces were already put in place and they needed to then just balance all of those using their eye."

"Tools can start with stuff that is off the shelf," adds Devereaux, "but almost always need to be customised to work properly for producers and artists. We need to customise the stuff to be able to work at the efficiency that we need [in order] that producers can focus on producing and artists can focus on creating. It's a constant process - we have five full-time staffers in our technology department that are constantly developing and creating, building, fixing. Every show has its own custom tools, but certainly as a facility we're constantly honing the pipeline tools as well."



“That’s the cool thing about VR – it’s pushing a lot of supportive technologies and platforms”

Brian Drewes,
Co-founder

other things’. Then we’re always starting with reality, so that you then don’t end up with something that doesn’t feel like it should be there. It’s definitely a weird thing; you’ll never see this in real life. It’s photoreal, but again it’s not comparable to any experience that you or I will ever have... We have a super-strong effects team and that kind of work is... the stuff that we’re excited to continue working on now that we have demonstrable capacity for that. In *Ghostbusters*, our work was getting compared with some really great established companies like Iloura and MPC. We were very fortunate to be entrusted with that character.” Devereaux adds, “We’ve just finished up *Patriots Day* for Peter Berg, and there are going to be effects at the level of the ghost. There are full digital cities and massive explosions and things like that, so that’s certainly hitting our recent cap as well.”

The recent popularity spike surrounding VR is also a challenge that the team at Zero VFX is excited to explore creatively. “It’s certainly something that everybody will interact with over the next few years, and at some point I’m sure we’ll have our place in it,” Devereaux affirms. “I think our view is [that] there’s a lot of supportive technologies that aren’t the content that is getting displayed in the devices.”

Drewes adds, “There are a lot of technologies associated with either how you render, how you motion track or how you do these things in a real-time manner. That’s the cool thing about VR for me – it’s pushing a lot of supportive technologies and platforms and leaves a lot of room for innovation and new, fairly innovative concepts to become reality. I personally haven’t been super-engaged by a lot of the VR experiences I’ve seen, but I have been engaged by



Zero's work on *Fences* included re-creating the skyline of Pittsburgh from 1957

some of the technology that is becoming available because of it... As far as going all in and saying, ‘we’re really really passionate about creating VR content and focusing our entire business on that’ – that would be a no-go for me. It’s more about the technology and other ancillary support things that can become cross-industry, because there are a lot of different industries that are all poking around this concept of real-time analytics and real-time data coming out, and being able to influence things in your environment with real-time analysis of either position or camera tracking. That’s the kind of thing we’re more interested in.”

The future looks bright for Zero VFX, with the company taking a refreshingly malleable stance on developments over the next few years, as Drewes tells us. “We have strategic plans, but they’re very flexible. As you get further away from the here and now, everything gets more flexible. As soon as you start making concrete plans, you start to get a bit of an ego about them. You’re like, ‘Well this is a good idea, and I said it was a good idea so I can’t go back on it now’. I don’t mind changing my mind; I’m not a politician so I don’t have to worry about people [complaining]. You have to adjust.”

Devereaux concludes, “We’re not looking to grow and be this huge company, but we are looking at being this smaller, elite team that is capable of competing with the big guys. I don’t know where that will take us in ten years, but I know that we’ll still be creating content. It could be in virtual reality, it could be feature films and commercials and making our own movies, but one thing we’ve always been passionate for is creating and telling stories, and that’s never going to change.”

OPERATING LIKE WELL-OILED MACHINES

The challenges of implementing and deploying a cross-site pipeline

“Our real focus right now is on pipeline tools to help us execute our work between both offices and share data between offices in a smart and intelligent way,” explains Drewes. “We can leverage the resources we have in both facilities irrespective of where the artist sits. When you’re trading thousands of elements on a daily basis there’s a lot of coordination needed both between the facilities and between the departments between the facilities down to a shot on a scene level. It becomes a quagmire of organisation that really does slow you down dramatically if you’re not doing it right. So for us, that’s something that’s underpinning our thrust to Los Angeles – [it’s] having that stuff be super, super tight, so that as our artists are working they are able to stay in sync with each other.”

Drewes continues, “It’s just one of those things where it’s constantly getting better, which is really cool to see, and that’s really where our focus is – on internal technologies, as well as other platform-based submission tools and other concepts like that.” He concludes, “We’re definitely working around the edges of some other service offerings that again, in the next year, we’ll be able to make some announcements on.”



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THE WORLD BUILDERS

Leading digital artists discuss how to craft compelling CG environments for the film, television and games arenas

The digital environments you find in film, TV and games projects might traditionally be 'in the background', but they almost always serve as key players in the stories being told.

Take the freeway chase in the film *Deadpool*, in which the 'merc with a mouth' cuts down a bunch of his adversaries. Partly shot live action but also fleshed out in fine CG detail by Atomic Fiction, the environment was crucial to the hard-hitting action.

The same can be said for Rodeo FX's Meereen city environment made for season six of the TV

series *Game Of Thrones*. The VFX studio built in layers of detail and a sense of 'place' while also revealing the city under siege.

Game environments are of course huge storytelling devices in their own right, too. And the one created by Cyan, Inc for its *Obduction* game using the Unity game engine is certainly no exception. Over the next few pages, the artists responsible for these film, TV and game worlds give **3D Artist** a tour around the methods used to bring these stunning environments to life.

“There is a sweet spot between the quantity of things you need to build and the natural randomness that placing these parts in context will generate for the eye.”

Matthew Rouleau,
visual effects supervisor,
Rodeo FX

MEEREEN WASN'T BUILT IN A DAY



Rodeo FX visual effects supervisor Matthew Rouleau reveals how he had to think like a city planner while building Meereen for season six of HBO's *Game of Thrones*



01 Different buildings for different areas We broke down the city into neighbourhoods and then determined how many buildings, houses, pyramids and temples we needed to create enough variety. Once we determine that, we start with sketches like these to draw out what individual buildings should look like. Then we simply model, texture and shade them individually.



02 Early concept art drives everything Once we had done a first pass of set dressing, we did a few renders and sent them for concept work like this. We painted over work-in-progress buildings and structures, and detailed what the lighting and atmosphere should look like. This became our guide to help us continue our work, and push towards final assets and lighting.



03 Keeping track of layout As we keep constructing our environment, we place our work-in-progress buildings in the layout and keep them all referenced. That way, any changes we make to buildings carry over in every layout scene. We just keep adding and dressing the environments with more and more models until it looks natural, then we are ready for lighting and rendering.



04 Defining the final look We pick a few master shots where we really develop the look of our environments and atmosphere. We add smoke to it as well, to reproduce the look of an active city. Some details like cliff sides are matte painted, depending on the number of shots. It comes down to speed of execution.



05 The city and its surrounds are built This particular shot in the show was a flyover. Water surfaces are added in CG and we animated ships, fireballs, fire and any effect needed to bring it all together. In comp we added subtle glows, other smoke elements, and graded the whole thing to match what the client wanted.

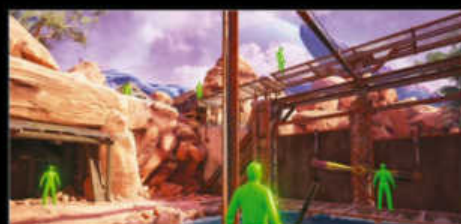
GAME TIME



Cyan, Inc art director Eric A Anderson breaks down some planning and execution techniques for building environments for game engines



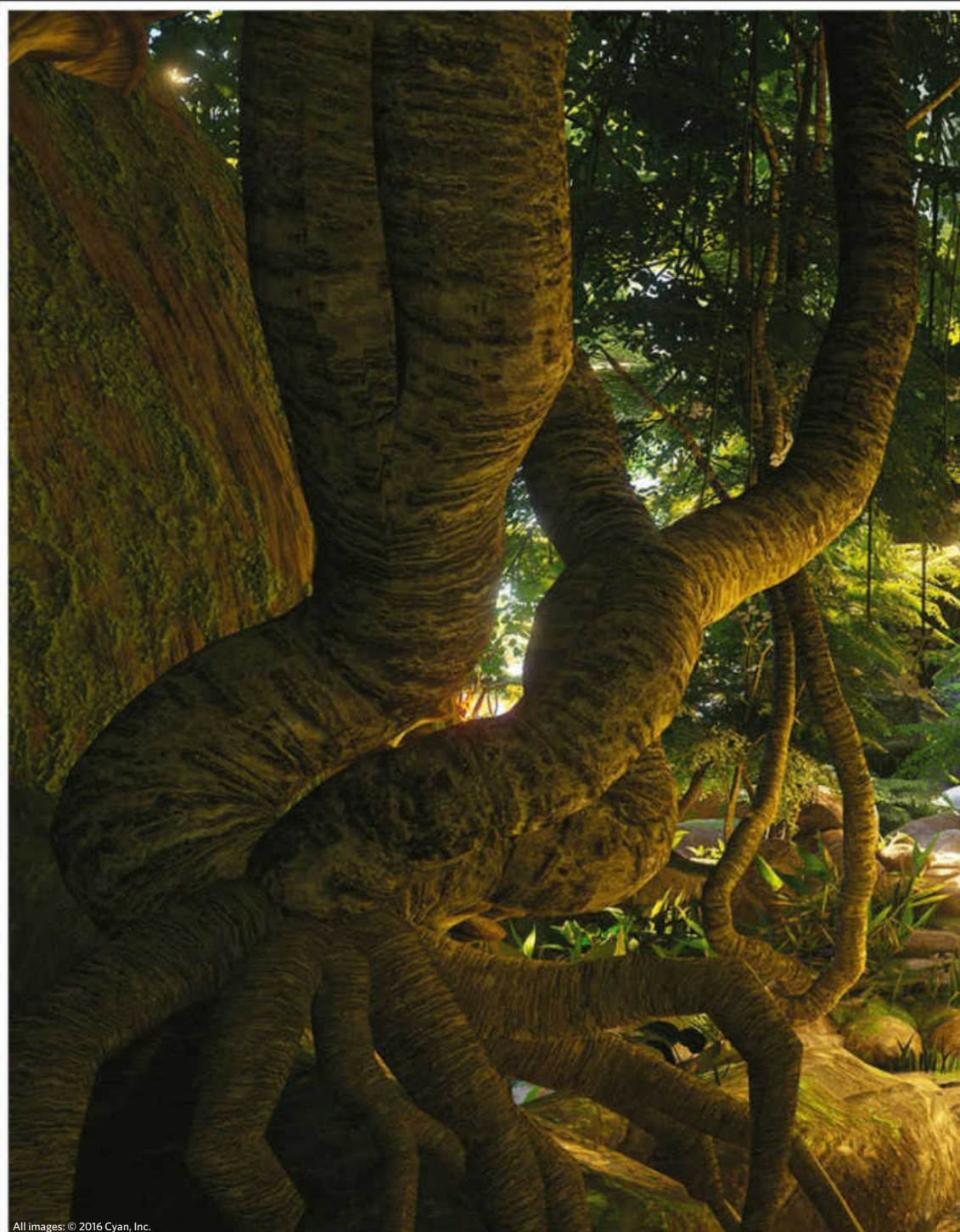
01 Massing models: a key first step This is what we call it at Cyan, others call it 'Whiteboxing' – blocking-in simple shapes to represent forms that will be built in detail later. Massing models should be constructed for the entire environment, prior to doing any real 3D modelling. It will save you time and money.



02 Use scale references early and often One of the most common mistakes I see from both beginners and veterans alike is not building things to correct scale. This is important not just so that objects in the game feel relative to the size of the player interacting with them, but also so that when looking across an environment, the player can infer an accurate sense of distance and scope based on objects in the scene.



03 Make the environment tell a story Even in a mostly abandoned game world, the environment itself is responsible for telling the bulk of the narrative. So think of the environment as a character. Infuse it with backstory, with history. Consider showing the effect of time on a place. In *Obduction*, we have a unique 'swapping' mechanic that is used throughout the game to juxtapose chunks of one world into another.



All images: © 2016 Cyan, Inc.



04 De-couple mesh maps from surface maps Wherever possible, I prefer to separate texture maps that need to be mapped specifically to a mesh (mesh maps) from tiling maps that can be more flexibly applied (surface maps). A great example would be rock sculpts that have a normal map or mask maps (for things like AO, ridge highlighting and so on), which define the large-form details, but must be locked to the mesh in a specific way.



05 Use world position-driven randomisation By randomising the UV offset of texture maps based on a mesh's world space position, or some other semi-random value, you can end up using identical meshes in close proximity, while avoiding telltale texture repetition. By only offsetting tiling surface maps, but leaving mesh maps where they are, you can still get very high-quality looking assets with tons of visual fidelity, while still making each copy look unique.



“If you can build a world where people want to slow down and look around a while, you’ve done your job right.”

Eric A Anderson,
Cyan, Inc

WORK MODULARLY (BUT NOT ALWAYS)

A modular approach to modelling and texturing is a useful time-saver, although there are times you can depart from this rule

Cyan, Inc’s Eric A Anderson notes that videogame environments are often so large that if you were to attempt to model and texture every single part of them and every single asset uniquely, you would simply collapse from exhaustion. “So reuse is king,” Anderson explains to **3D Artist**, “and it’s important to author game assets with reusability in mind. Wherever possible, meshes should be flippable, turnable and ‘generic’ enough to be used en masse and to get as much mileage out of them as possible.”

Although reusing assets can be more efficient for game artists and save a lot of time, Anderson additionally advises that it can still be useful to identify hero props inside of the game that can also stand on their own. “The key is being deliberate when authoring them,” he notes. “Unlike modular parts, hero meshes can be as distinct and quirky as possible. By sprinkling hero assets strategically into an environment you actually trick the viewer into not realising how modular the rest of the space actually is!”





“What it really came down to was handling all the data, textures and geometry and remaining as efficient as possible”

Ryan Tudhope,
visual effects supervisor,
Atomic Fiction

ROAD RAGE

Deadpool's signature - and brutal - freeway chase came together thanks to a combination of live-action green screen elements, some Vancouver backgrounds and extensive photoreal CG characters, vehicles and environments by Atomic Fiction

What did you look to for reference for the city featured in the chase?

Ryan Tudhope, visual effects supervisor: The city chase ended up in a real-world version of Vancouver, but back from that we designed a mix of cities - elements of Chicago, Detroit and Vancouver. We looked for really great references to build up the town.

How did you plan out the city and where the action would take place?

Ryan Tudhope: There was initial previs from Blur Studio, and then we did a bunch of production paintings and concept frames for the key angles. Meanwhile, our environment supervisor Seth Hill was working with the modellers and getting all the bigger elements of the city itself built. Our animators would be refining the shots, taking those

previs cameras and layouts and doing first tests of the animation.

What toolset did Atomic Fiction use for the freeway chase shots?

Marc-Antoine Paquin, technical director: *Deadpool* was only the second show we did using Katana, and we had yet to figure out the pipeline to build the required highway/city environment. So we ended up creating a hybrid workflow between Maya and Katana. In Maya we created a wide array of city props (lamp post, fire hydrant, overpass and so on) which were published as Alembic files. During this time, look dev for the props was being done in Katana then published as look files.

How was the CG city and freeway environment then pieced together?

Marc-Antoine Paquin: To assemble the whole city together we would instantiate props as GPU caches and place them in Maya to form highway sections. About ten of those sections were created to avoid overburdening scenes. The sections were then converted from Maya to Katana using the ScenegraphXML format (provided by the Foundry and modified to fit our needs). Once imported into Katana, the XML reader would reassign Alembic

props with their materials (from look files) making them ready to be rendered. Extra steps were also taken to optimise rendering, such as hiding geometry outside of camera frustum (via automated analysis batch scripts).

What small details do you feel helped sell the freeway shots?

Jed Smith, compositing lead: The sequence takes place just after it had rained, so some shots had wet cement on the freeway. We were able to adjust how wet the road was in our comp using the rendered AOVs. We also added hanging mist along the roadway, and steam coming off the tops of buildings. We had deep renders of the environment, so we were able to pretty easily put a massive amount of 2D steam elements on cards and then do a deep holdout. We also added crepuscular rays in some shots where the sun was shooting between buildings and illuminating the steam.

Haze is one of the most important things in getting CG environments to feel real. We have a tool in Nuke that allows us to adjust colour, brightness and opacity of the haze over distance. Pushing the saturation of the haze a little more blue and a little bit more opaque as it gets farther away is a little detail that can help make it feel real.



Technique focus

Incredible 3D artists take us behind their artwork

CONCEPT The most important part of any visual project is to determine the concept. A well-settled concept saves time for modelling, creating materials and lighting. I started modelling in ZBrush using DynaMesh, then started creating the cloth in Marvelous Designer and exported it back to ZBrush to be sculpted. I also used the Ornatrrix hair plugin for 3ds Max.



Chamishka Gamage
chamishka.com

3DArtistOnline username:
chammi3000

Software 3ds Max, ZBrush,
Mudbox, Marvelous Designer,
Ornatrrix, V-Ray

Albert Einstein,
2016



Rig, twist & stretch dynamic characters

Save the day and learn how to rig and deform limbs with twist, stretch, IK and FK systems

Rigging, however complicated, is one of the main processes in the animation pipeline. It will inform the software how the virtual mesh will change, move and how the animation will look at render time. The technical director's job is to produce systems that provide easy and efficient ways for animators to achieve the desired result for a show. 3ds Max is a software that provides us with many tools for making great systems, but even so, there may be times when we have to create our own tools – to do this we can use the programming language MAXScript. In this tutorial, we will show you some of these features applied to a dynamic cartoon character.





JOÃO VICTOR FERREIRA
Super Hero, 2017

Software

3ds Max

Learn how to

- Create an IK Spine
- Develop a stretch system for the spine
- Make a twist system for the spine via expression
- Create a stretch system for the arms via MAXScript
- Produce a bend system for the arms
- Develop a traditional reverse foot system
- Create standard FK hand rigging and head rigging

Concept

I made this character to explain how to create interesting systems for cartoon rigging. These systems provide nice deformations for cartoon animations.



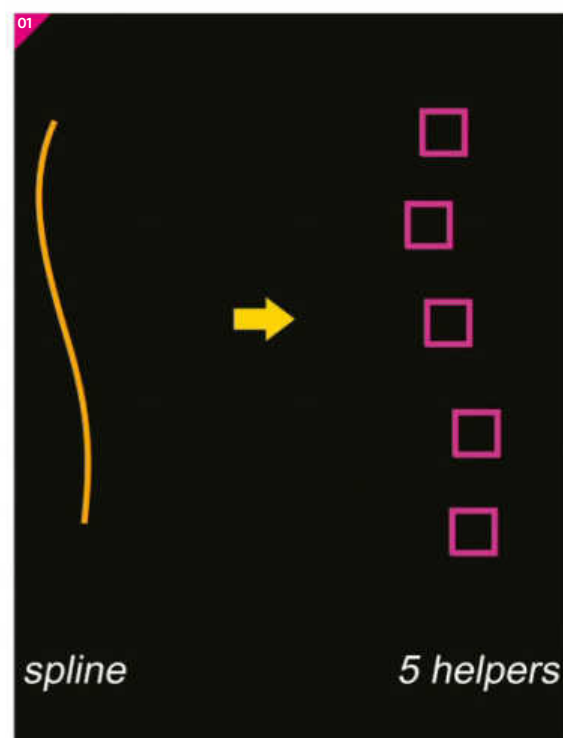
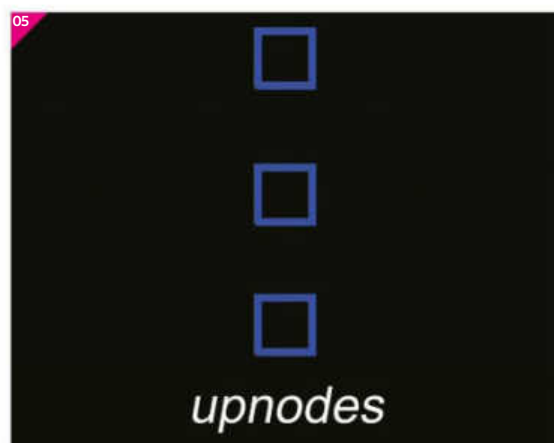
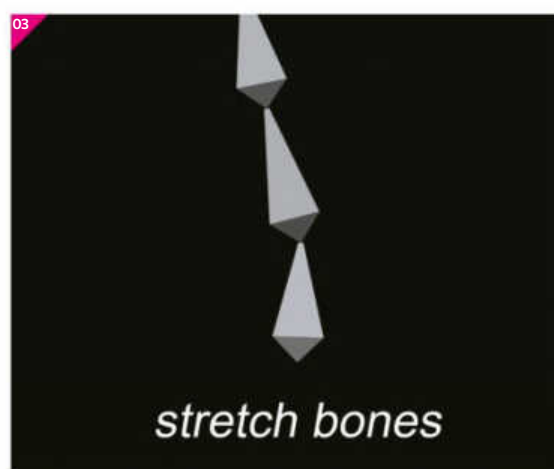
01 Create the spine To start, create a line (shape object) with three vertices. Create five helpers named Spine_Anchor_01, Spine_Anchor_02 and so on. Distribute it on the spline via Path Constraint. Put each one in these percentages: 0%, 25%, 50%, 75% and 100%.

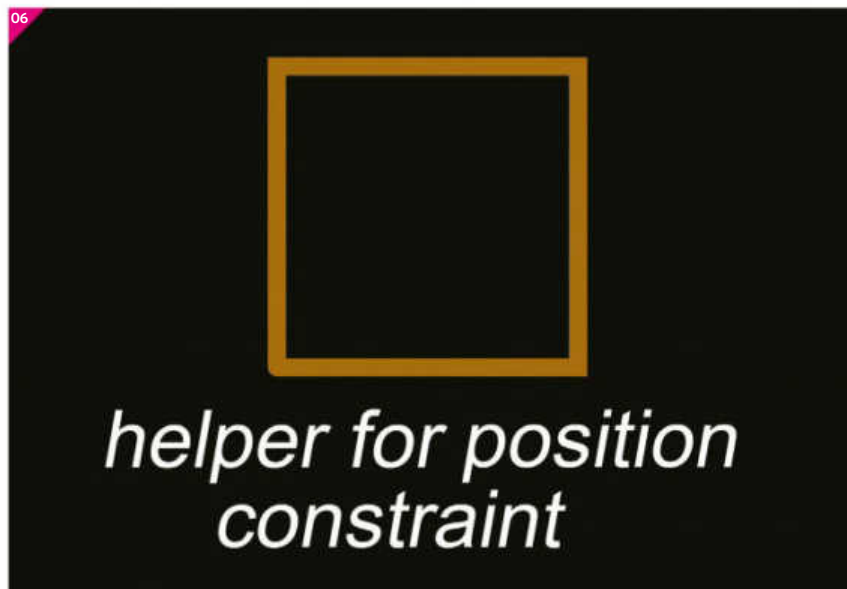
02 Make the splines Add a Spline IK modifier to our spline shape so that we can control this line with three helpers. Do not forget to check the Unlink option. Name these new helpers Spine_Helper_Lower, Spine_Helper_Mid and Spine_Helper_Upper, respectively.

03 Add bones Now we will make our bone chain. Create five bones, one in each anchor. To make it stretch, we will use the Position Constraint and LookAt Constraint feature. Put a Position Constraint for each bone to corresponding anchor, and a LookAt Constraint for the next anchor. Note that the last bone chain (the nub) will have no LookAt Constraint. Now it is stretching.

04 Link controls Next, create simple shapes to be your controls, and link each helper (Spine_Helper_Lower, Spine_Helper_Mid and Spine_Helper_Upper) to each of them. Name it Spine_Control_Lower, Spine_Control_Mid and Spine_Control_Upper.

05 Create helpers We now need to create the upnode helpers, in order to prevent the bone chain from flipping. Create one helper for each bone (except the last one, the nub) and position it in front of them. Name it Spine_Upnode_01, Spine_Upnode_02, etc. Now, go to the LookAt Constraint properties of each bone and choose each upnode helper to be the upnode vector. Check the LookAt mode in the Upnode Control group. Now the rotation bones follow this Upnode helper. Note that depending on the view that you have created the chain, you may have to change some parameters in LookAt Constraint properties, like Source Axis for example.





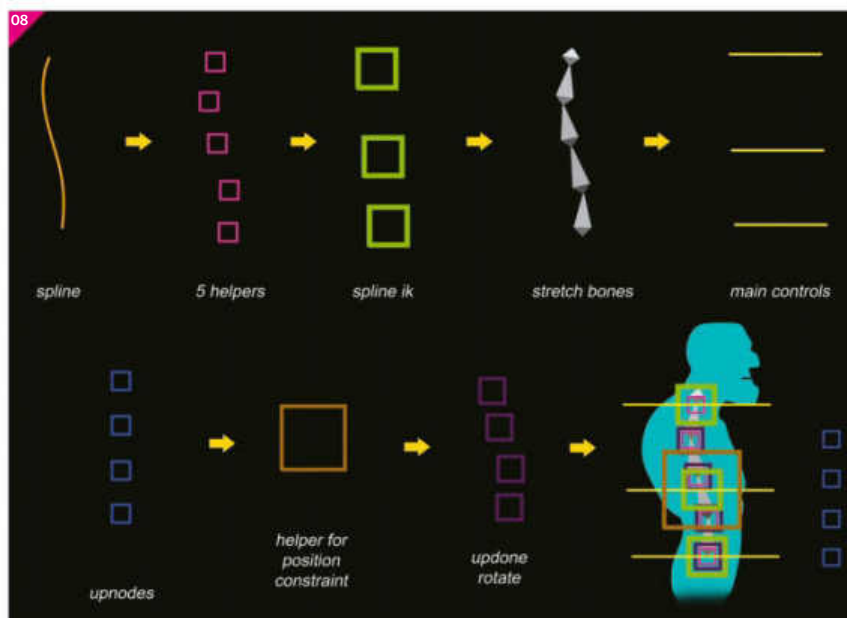
06 Centre the spine Now we will create a helper that always puts the Spine_Control_Mids in the centre of the spine. This enables us to stretch the spine uniformly. Create a helper, name it Spine_Helper_Mid_Pos_Constr and link the Spine_Control_Mid to it. Create a Position Constraint from Spine_Helper_Mid_Pos_Constr to two targets: Spine_Control_Lower and Spine_Control_Upper. Now we can stretch the spine uniformly and move the Spine_Control_Mid to bend it!



07 Twist the spine Next we have to create the twist feature of our spine. Note that we created some upvector helpers, so we will make it rotate on each anchor axis. So, create one helper for each upnode helper, and name it Spine_Upnode_Rotate_01, Spine_Upnode_Rotate_02, etc. Align each upnode rotate helper to each anchor. Now, link each upnode helper (Spine_Upnode_01, Spine_Upnode_02, etc) to each upnode rotate helper (Spine_Upnode_Rotate_01, Spine_Upnode_Rotate_02, etc). At present, if you rotate the upnode rotate helper, the upnode helper follows it and consequently rotate the bones. It will make our spine twist in the next steps.

08 Rotate the middle twist Now, we will do a wire parameter from the upnode rotate helper of the start of the spine to the control of the start of the spine (Spine_Control_Lower). For the twist effect, you need to rotate the middle twist the average of the start and end controls. To do this, we can add a float expression controller in the y axis (or the rotation axis you have chosen) of upnode rotate helper 3 (the mid helper rotation).

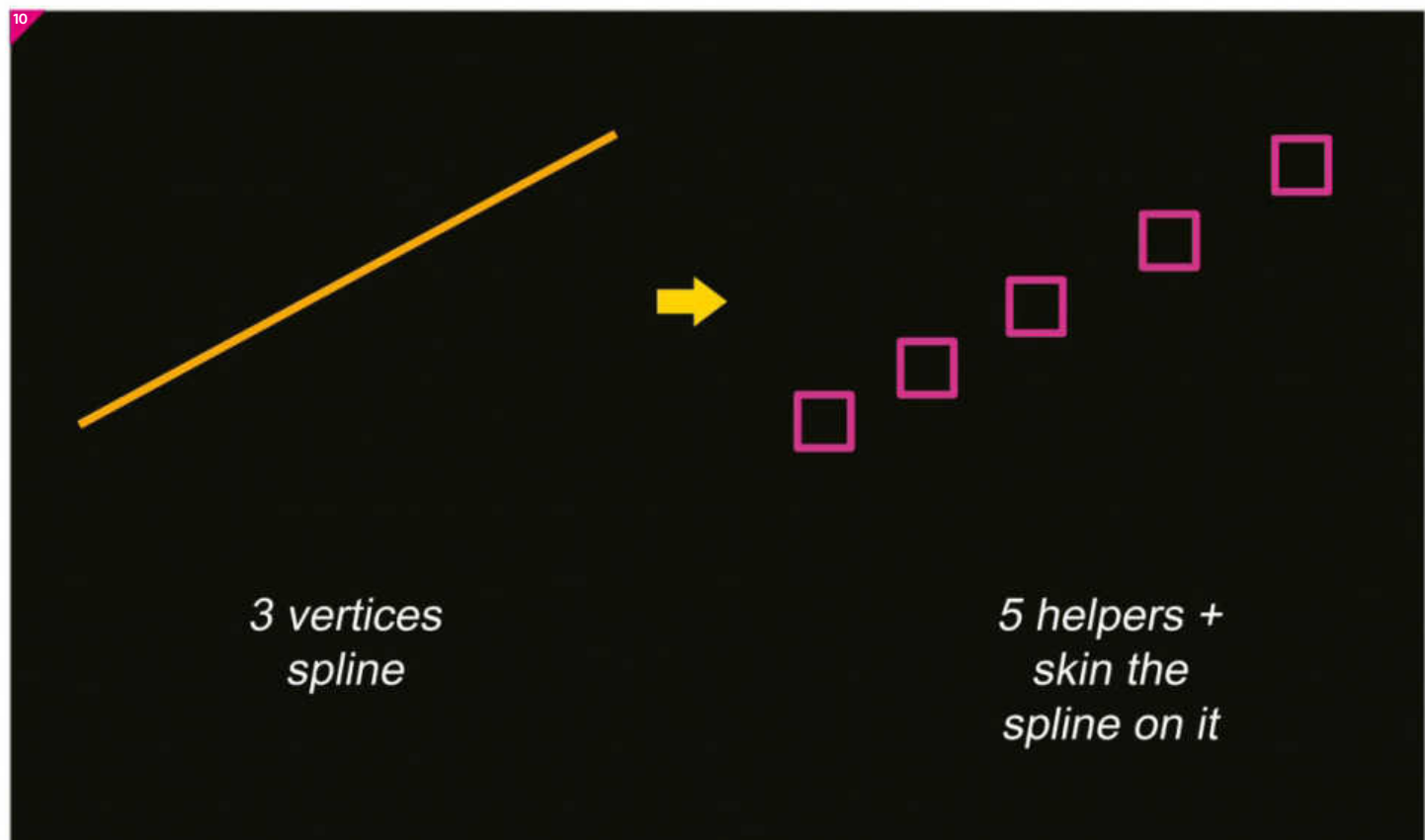
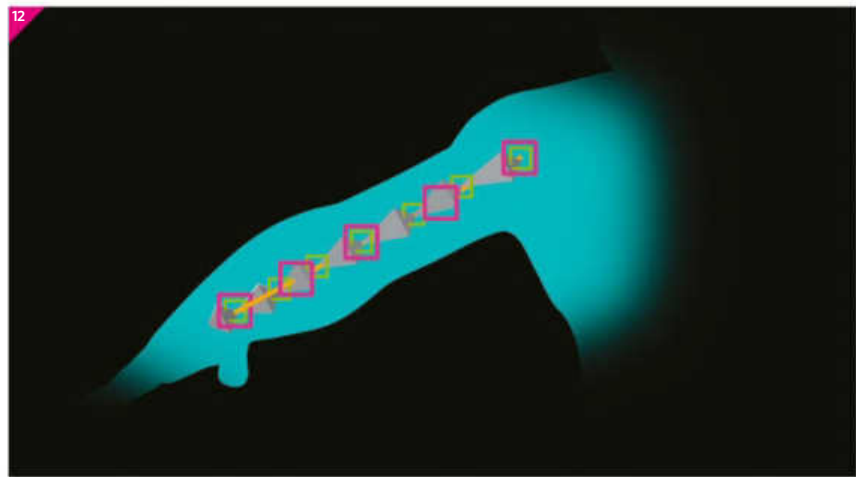
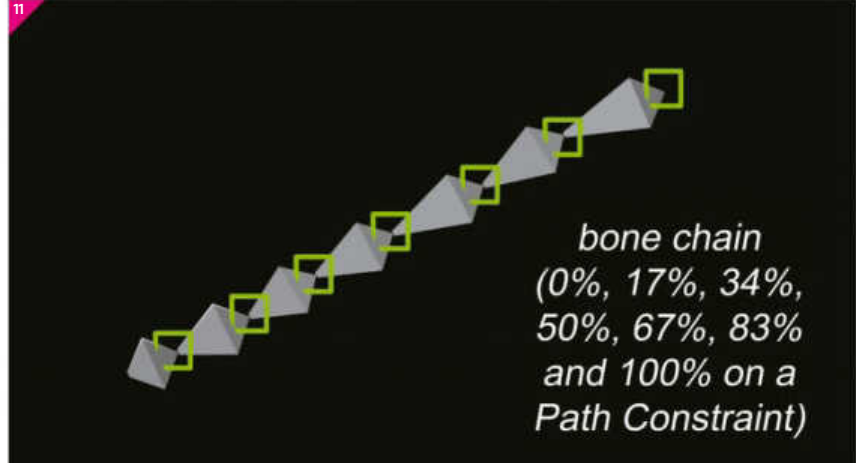
09 Add controllers Inside this controller, we will add two scalar variables: Ctr_start (for this variable, we will set the y rotation controller of the start control), Ctr_end (for this variable, we will set the y rotation controller of the end control), and we will add the script: $((\text{Ctr_start} + \text{Ctr_end}) / 2)$. This will give us the average of the two rotations. Let's do the same for the second upnode rotation helper, using the start control and the upnode rotation helper of the middle, and then the same for the fourth upnode rotation helper, using the end control and the upnode rotation helper of the middle. Now rotate the start control or the end control – it's stretching, bending and twisting. In the next part, we will make the arms.

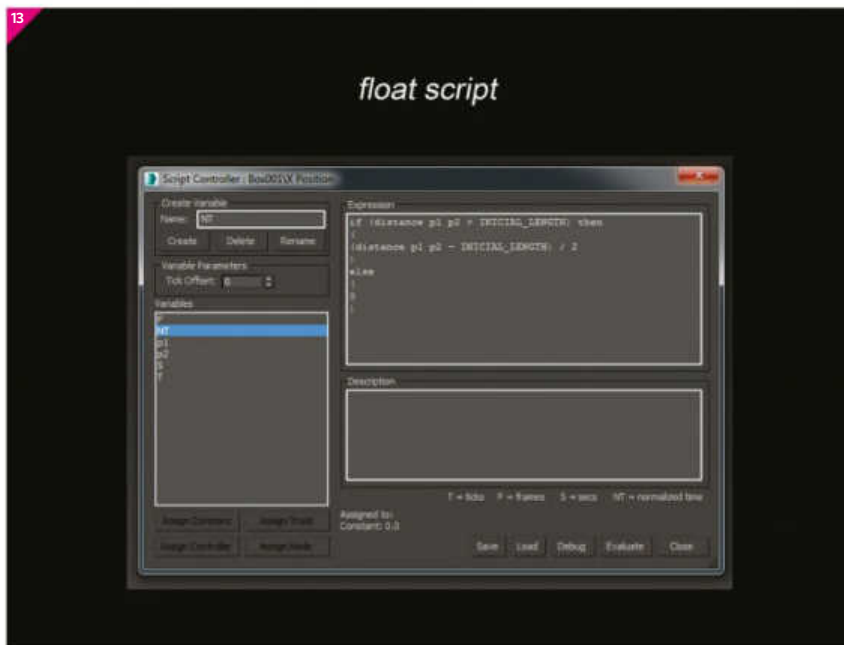


10 Create splines for the arm In this part, we will create an arm that stretches and bends with some script and an IK system. Create a spline with three vertices, one for the shoulder, one for the elbow and one for the wrist. Make the middle vertex the bezier corner. Add five helpers (Arm_Helper_Shoulder, Arm_Helper_Elbow, Arm_Helper_Wrist, Arm_Handle_Forearm and Arm_Handle_Upperarm). Skin the spline with these five helpers. Link the handle's helpers (Arm_Handle_Forearm and Arm_Handle_Upperarm) to the Arm_Helper_Elbow and align them to it. Now freeze the transformations of the five helpers.

11 Add bone chain for the arm Now create a bone chain (six bones and seven helpers). Make a Position Constraint for each bone to each helper, and a LookAt Constraint for the next helper. Choose the upnode of the LookAt Constraint for each current helper. Now we have our bone chain stretching. Put each helper of the bone chain in a Path Constraint to the spline that we have created at these values: 0%, 17%, 34%, 50%, 67%, 83% and 100%.

12 Develop bone IK system Create the simple IK system for the arm with a shape to control the swivel angle, but before assigning the IK system, freeze the bones' transformations. Align the position of Arm_Helper_Shoulder to the upper arm bone, align the orientation and link to the shoulder bone. Align the Arm_Helper_Elbow to the forearm bone and link it to the upper arm bone. Now, align the Arm_Helper_Wrist to the hand bone and link to the IK solver. Add orientation constraint in the Arm_Helper_Elbow to the upper arm bone and forearm bone. Set the elbow orientation with an average of the rotation of the forearm and the upper arm. We can now control the bending by the handles.





13 Make it stretch Let's check the initial length of the arm. Write this script on the MAXScript Listener: (Distance \$Arm_Helper_Shoulder \$Arm_Helper_Wrist) and press the NumPad enter. Note that the dollar sign means that this is a node in the scene. This will return us a value. Save this value, because we will use it later. We will stretch the arm, increasing the value of the X position of the bones. So, add a float script controller in the X position controller of the forearm. Create two variables: P1, for the node Arm_Helper_Shoulder and P2, for the node Arm_Helper_Wrist. Write this script:

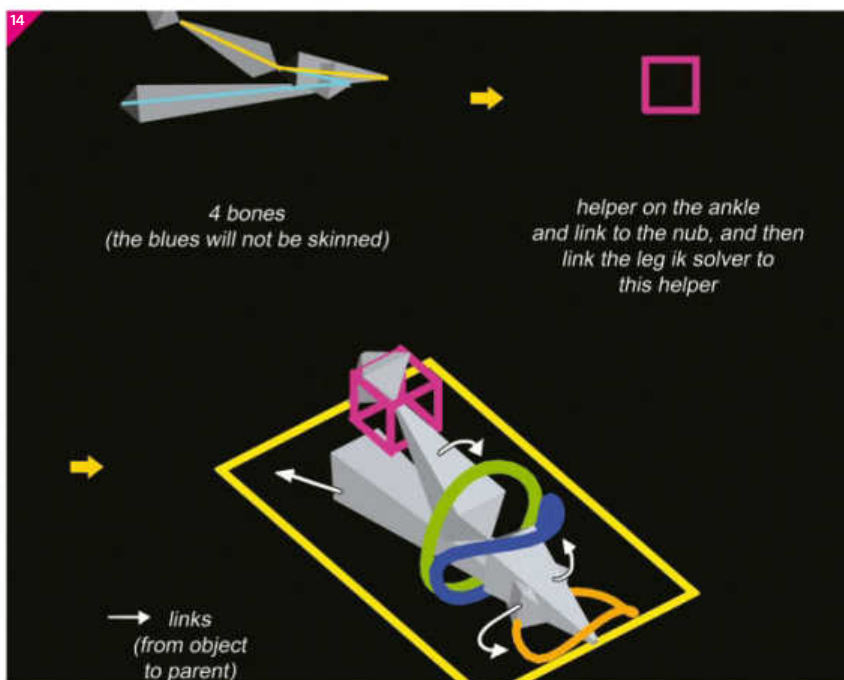
IMPORTANT: In the place of INITIAL_LENGTH, write the initial length that we got in the previous step.

```

if (distance p1 p2 > INITIAL_LENGTH) then
(
(distance p1 p2 - INITIAL_LENGTH) / 2
)
else
(
0
)

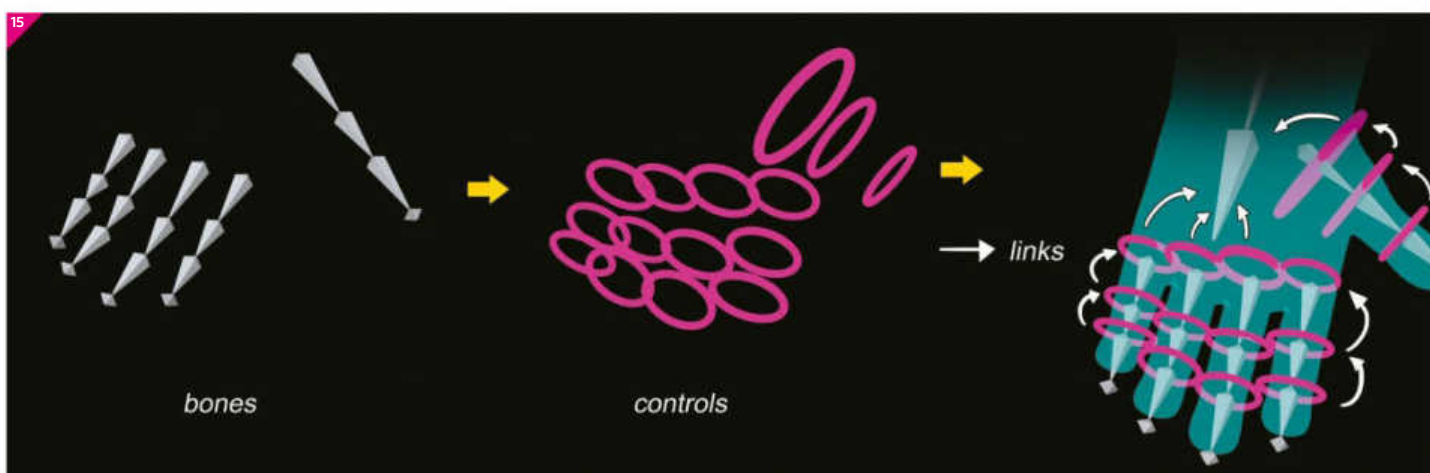
```

Do the same for the nub bone. Now the arm stretches if the length is greater than the initial length. You can do the same for the legs.

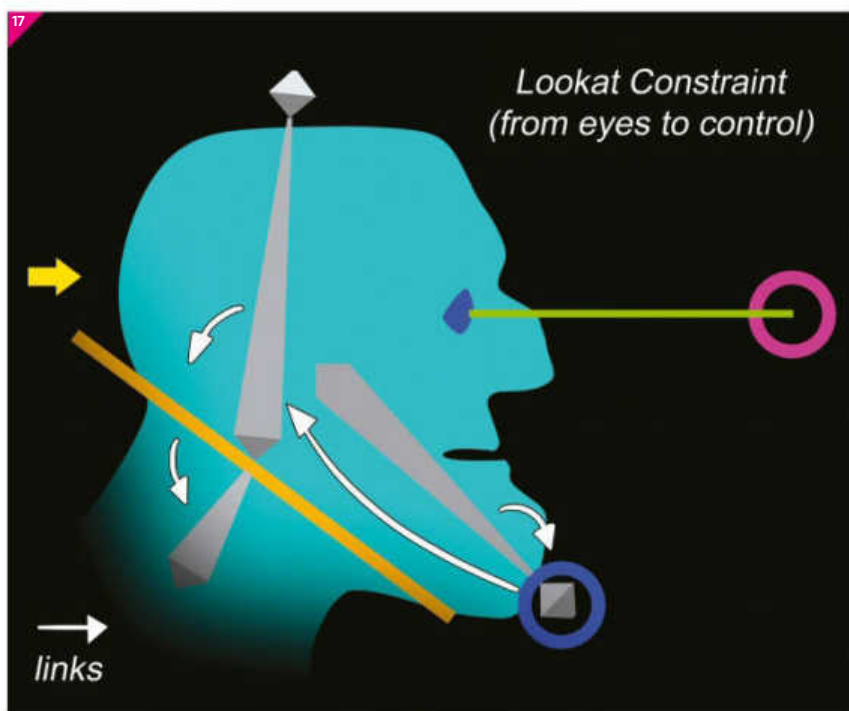
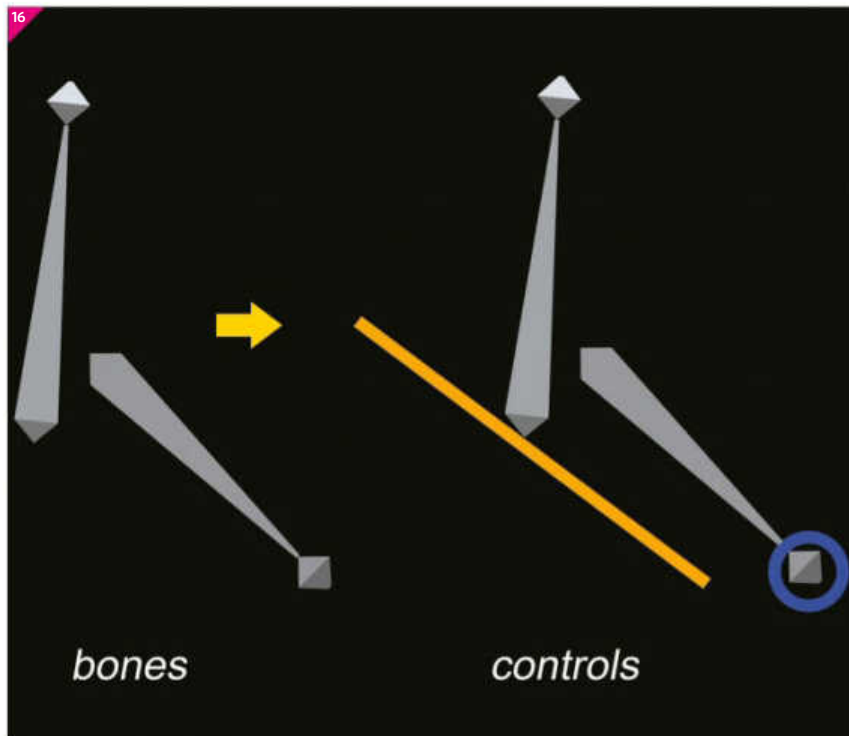


14 Reverse Foot The Reverse Foot is a solution that enables us to have many cool controls to rotate the feet. This system controls the main rotations. Create the bones chain from the bottom of the heel to the ankle. Now duplicate the foot bone for make the toe's bone by rotating this one. Create a helper placed on an ankle and link it to nub of the foot chain. Link the IK solver of the leg to this helper. Put the pivot of the foot master control on the ankle by the feature Affect Pivot Only. Link the bones to the respective control and the two controls of the foot (foot and toe controls) to the tiptoe control. Link the tiptoe control to the foot master control. Now we have a cool system. We can rotate the entire foot, only the toes, or only the ankle.

15 Create hands with an FK system For the hands, we can use a classic FK chain. Put the bones on the finger joints. Note that the thumb bone starts almost on the wrist. Create a control for each bone. Now, we have to make the links, and then link each bone to each control. Link each control to previous one. With this simple FK system, we can select each control and rotate it with the Local mode for bending the character's fingers.



16 Work with the head Create a bone for the head, and another bone for the jaw. Create a control for the jaw and name it Head_Control_Jaw. Put the pivot of this control on the pivot of the jawbone using the Affect Pivot Only feature. Create a control for the head and name it Head_Control_Head.



17 Link bones to controls Now we can link each bone to the corresponding control. Link the control of the jaw to the head bone, and the control of the head to the neck bone. We can link the eyes on the head bone, too. Note that we can squash the head scaling the head control with the Select and Squash mode. Now, make two controls for the eyes and put them in front of them. Add a LookAt Constraint from each eye to the respective eye control. You might need to check the Keep Initial Offset mode. It will compensate the orientation of the eye, and will leave it correct.

Showcase

João Victor Ferreira

Hello everyone! My name is João Victor and I am a CGI artist from Brazil. I worked for years in advertising, making stills and animations in studios, and now I am working as 3D generalist for a television company in Rio de Janeiro.



Happybulbs, 2016

3ds Max, Corona Renderer, Photoshop

I made this image for my wife - there is an Easter egg of her name in there. It was useful for a Corona Renderer test.



Mini at Rome, 2011

3ds Max, fryrender, Photoshop

I made this project a few years ago to study car modelling and rendering. It is a Mini Cooper at an alley in Rome.

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Build realistic procedural structures

The main goal for this project is to explore more complex relations in a building, rather than a simple box

To appreciate what 'realism' means in the context of procedural art creation, let's first discuss certain aspects of our perception. Humans are great pattern-recognition machines. We deal with a huge amount of data on daily basis and at a certain point our brain starts to classify those into 'stereotypes' or 'patterns'. We've seen it once, we do not have to see it again to appreciate its meaning. However, our brain is so good at 'archiving' that extracting the original information can be troublesome. In my opinion, that is the foundation of one of the most intriguing parts of proceduralism. With proceduralism, you have a blank slate; a machine with no knowledge of 'art', with no sense of 'artistic'. Therefore, the question becomes: "Can you decipher and break down into understandable chunks what 'appealing', 'good-looking', 'real' ultimately is?" Art is an abstraction, just like programming, and we are going to make these two dimensions work together to produce the result you see here. Think of it as a painting process – we will start with wide, general brush strokes and go deeper and deeper to the finest details. Instead of brushes, our tools will be VEX (a C++ based Houdini language) and native Houdini nodes.

The generated houses are done fully inside of Houdini, all the way from the initial silhouette to the final shading. This tutorial will provide you with a general overview of some of the procedural techniques I'm using for the *Procedural Lake Houses* project. For the full step-by-step tutorial, feel free to visit my website or my Gumroad page.





**ANASTASIA
OPARA**

*Procedural Lake
Village, 2016*

Software

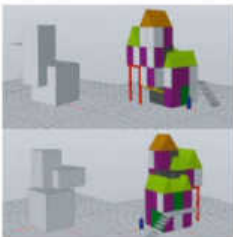
Houdini, Photoshop

Learn how to

- Automate the creation of a production-quality asset
- Break down a complex procedural system into small and understandable chunks
- Create procedural patterns and assets
- Combine both pre-made and generated parts
- Design abstract rules that help to achieve realism
- Understand the importance of relations and dependencies inside of a procedural network

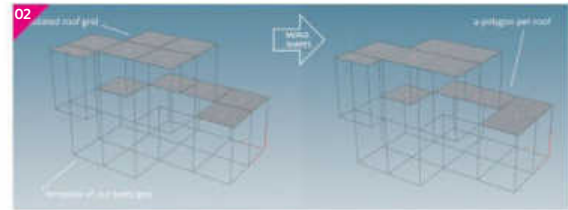
Concept

This is one of the early prototypes for the *Procedural Lake Houses*, which was a logical continuation to my exploration of relations in building creation from my previous *Houdini Unreal 4 Building Tool* project



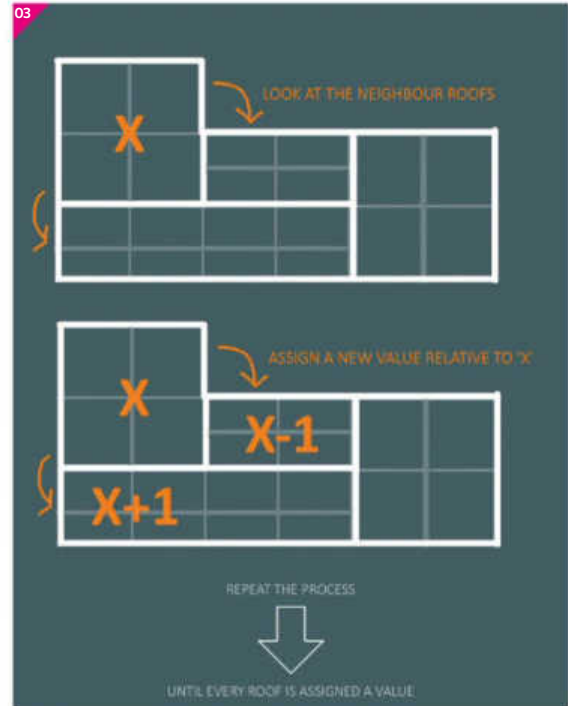
Before starting

We will be working in a very close relationship with a grid-constrained environment. With that in mind, you need to determine what size for one grid tile would work for you. In my project, I used 2x3x2 metres.



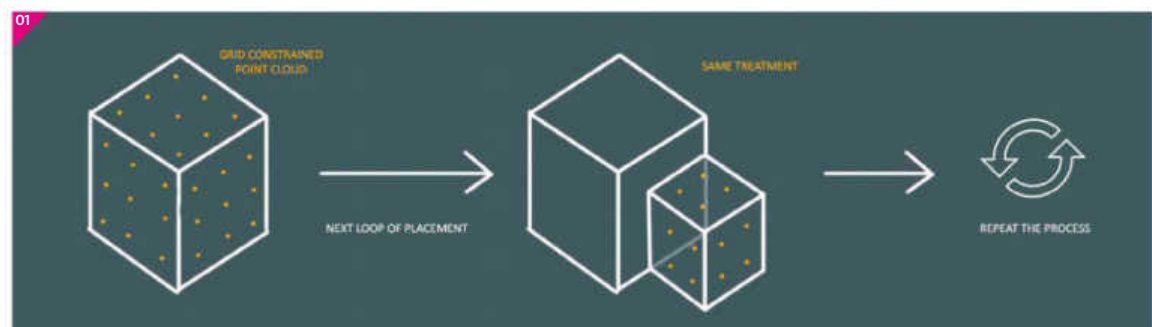
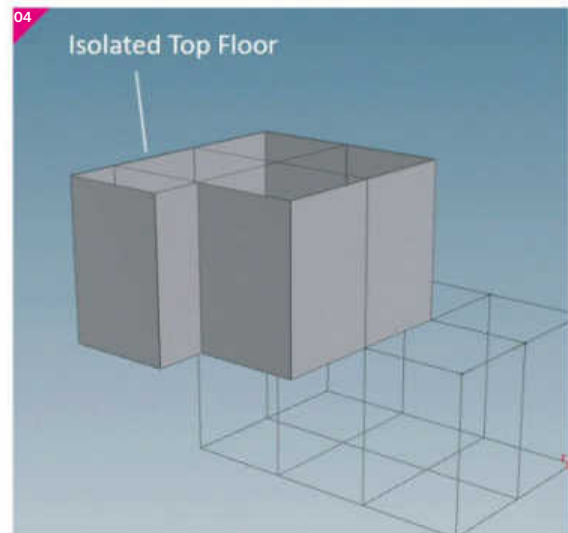
01 Make a body silhouette The idea behind a procedural body silhouette is quite simple. First of all, we need to ask ourselves, 'How do we build something when we do it manually?', and the answer is that we always build something in relation to what we already have. Therefore, our starting point will be a box, which we will convert into a grid-constrained Point Cloud with a Scatter node and VEX (you can also use Points From Volume), and that Point Cloud will be a driver for the placement of all the future boxes. And those future boxes will get absolutely the same treatment, therefore driving the next loop of placement.

02 Roof base Once we have the body set up, we can continue building our relations, and the next step will be creating the roofs. We already have a great foundation, which is the top surface polygons of our body, which we can isolate with a Blast node by asking it to delete the faces, whose normal doesn't face upwards. However, the remaining polygons represent the grid, and we would like to have one square polygon per roof. By merging the grid tiles together with their neighbours starting from a random one, we will achieve a great variety of patterns.



03 Roof heights The next step would be to calculate the elevation of each roof. We will start with an abstract elevation X, which we will assign to any roof, therefore making it our starting point. By looking at the roof's neighbours and their relative position, we can label each neighbour with an elevation of X+1 or X-1. We can repeat this loop until every roof gets a certain value relative to our starting X, which, upon completion, will be converted into a numeric attribute. That attribute will drive the strength of the extrusion.

04 Body modules placement Now it's time to populate our procedural building base with pre-made modules. The idea is quite similar for every asset, therefore I will make an example of Stairs module. By isolating the polygons that have a Y position above the first floor of our grid we can find the possible locations. However, some of them can be situated in places that would make our stairs intersect with the body. Therefore, we have to cast rays from that position to check whether the space for our possible placement is not occupied. This can be achieved with VEX or Ray SOP.





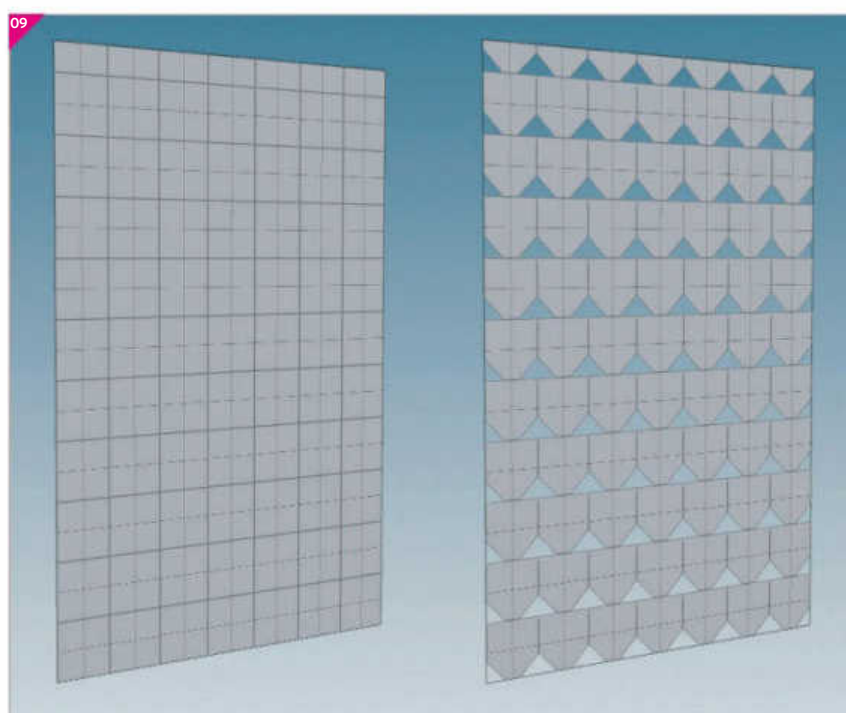
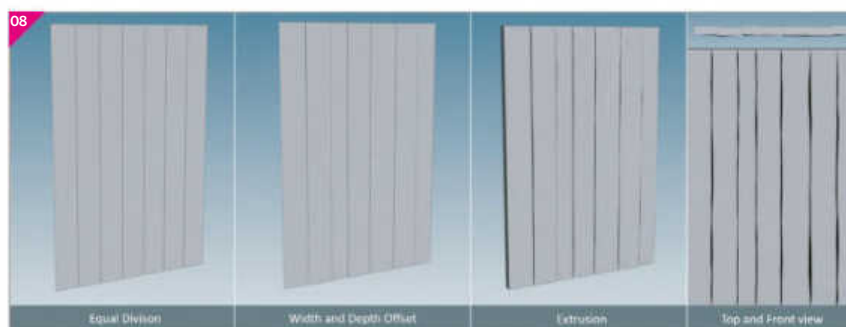
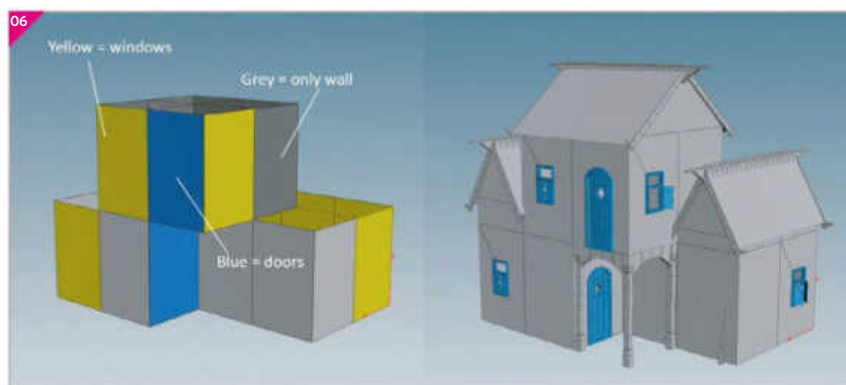
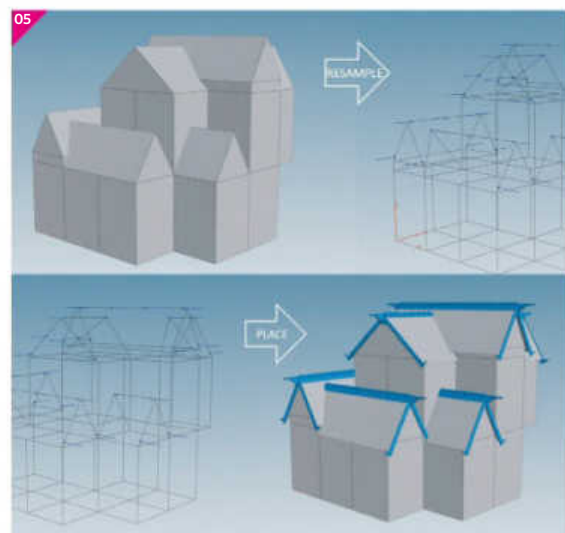
05 Place the roof modules Roof modules are a bit trickier because they require a custom scale attribute as, unlike the grid-constrained body, each of our roofs has its own dimensions and scale. By resampling the edges of our roof with our custom rates with VEX, we can extract the positions for the roof rims modules. As for the orientation, we can calculate a vector based on the direction of the roof base that would serve as a guide.

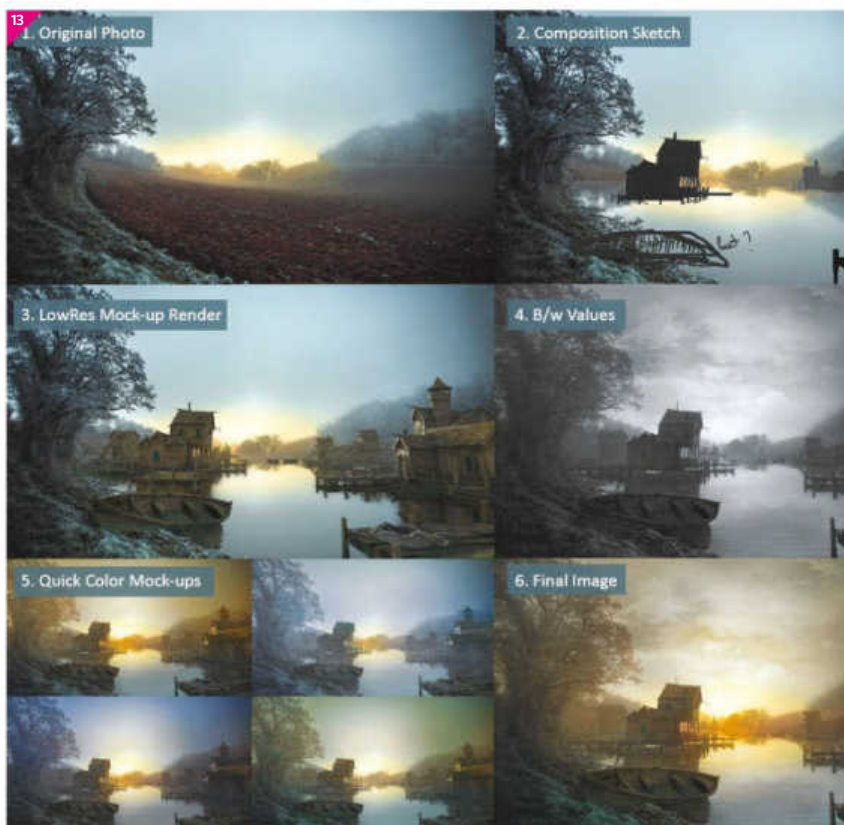
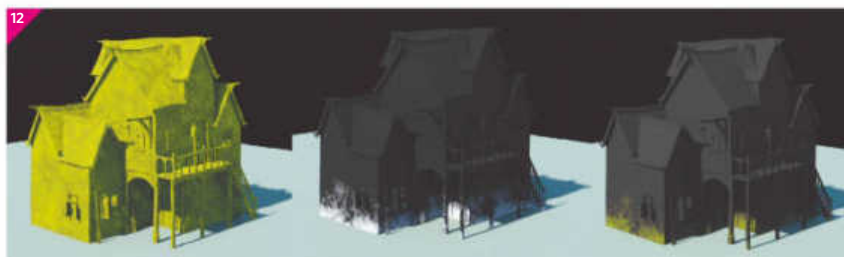
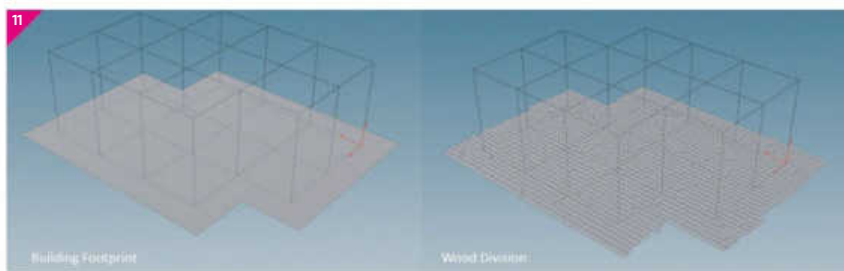
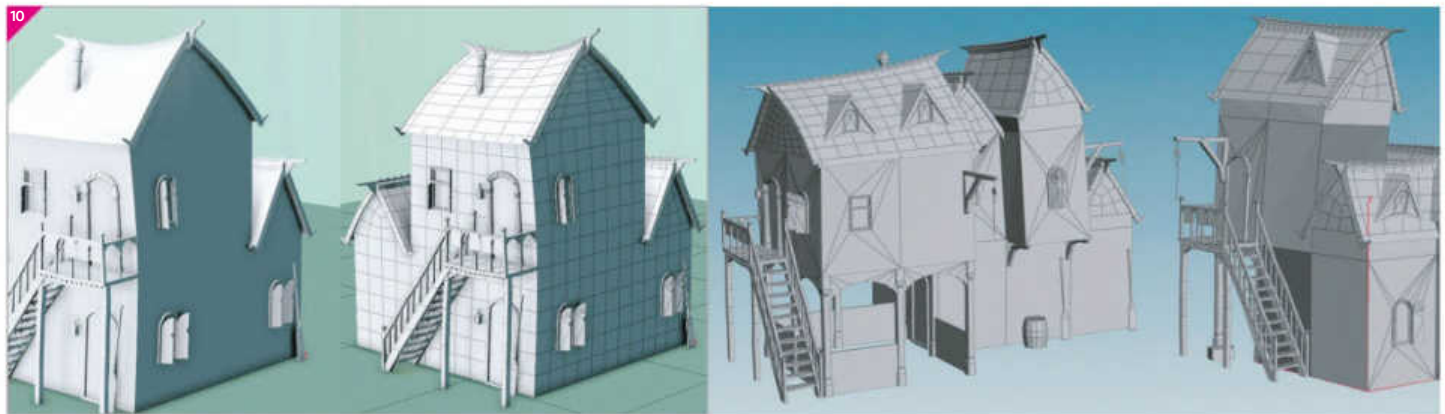
06 Place the doors and windows The last step for the procedural module placement is to place doors and windows. We will need to create a Random Seed that will control which faces of our body will become doors or windows. We will also need to take into account that we do not want doors where there's no access to a floor, or windows that would look onto walls or roofs. That can be achieved with, again, ray casting and by labelling each face with an attribute of its type, such as 'door', 'window' or 'wall'. By introducing a probability control, we can manipulate how many windows we want in the final result.

07 Patterns Seed pool Now it is time to move on to creating procedural patterns for our walls. First of all, we don't want every wall to have a unique pattern because that would become too noisy. Therefore, we will create a pool of possible Seeds for every wall to choose from. That Seed will drive the pattern creation. This way we can control how many patterns we want per building and what unique proportion between wooden beams and wooden scales they would have.

08 Generate wood patterns To achieve a believable wooden beam structure, we will start with a Divide node to give us equal splits of an average beam size we would like to have. However, in real life those will never be entirely identical, especially if the house is old. For that reason, we will randomly offset the edges to give the divisions a more 'organic' look. We will do so in both depth and width dimensions.

09 Create the scale pattern The foundation for our scales will be our wall divided into a square grid, where every tile is cut to form a shape of a scale. You can think of it as a factory assembly line, where every tile from the wall is placed onto the origin to ensure that the 'blades' of our cut operation (Clip SOP) always have the correct relative location.





10 Roof and body deformation One of the vital steps to giving our building character is making it crooked. We will do this in layers, starting with the roof. It's crucial not to create holes in our geometry during this stage, which is why we will mark key points and exclude them from the deformation. We will use a Lattice node, where we will translate, scale and rotate parts of our Lattice box, which is responsible for the deformation. The same step will be repeated for the whole body and top floors, giving a more complex-looking result as opposed to the one with only a single deformation.

11 Procedural pier Another fully procedural asset is the pier. By isolating the building's footprint and expanding it, we can easily derive the necessary area for the pier. As for the wooden beams, the technique is similar to the wood pattern generation. In this case, however, we would have long streaks of geometry, which wouldn't look very realistic. Therefore, to break them, we will run a loop where we find the biggest wooden beam and, if it's too large, we'll divide it. Keep going until all of the wooden beams satisfy to our length condition.

12 Shade and render in Mantra Up until this point we've accumulated a lot of attributes, which we will use to drive our procedural materials and randomise the colouring of our wooden beams and their tonal offset. We will assume that the house wasn't built from the same tree - in fact, it could have been built from multiple species. All of these extra touches and attention to detail will create a hand-crafted feeling to the final generated model. A lot of dependencies for distribution of things like moss are controlled by the Y position, which will help to regulate the multiple layers of noises that serve as a mask.

13 Composite the promo image After the system is finished, we can ask it to generate as many houses as we like. I baked around a hundred and then selected the ones that would work the best with the composition sketch I made for the promo shot. The background for the final render is a photo from my personal archive from a trip to the south of France. A biting frost, and at the same time a warm and gentle early morning look imprinted itself in my mind and I tried to re-create the feeling in the final compositing. The water surface and reflection is a separate render pass, which was composited into the main image later. Smaller details like frost on the roofs, nets and tiny silhouettes of people in the boats are painted in Photoshop. Once the main render passes were assembled together, colour editing and the mood were achieved in Photoshop as well.



JONATHAN BENAÏNOS
Real Time Taurus
Raging Bull, 2016

Software

ZBrush, Maya, Substance Painter, Photoshop, Marmoset Toolbag

Learn how to

- Create a high-poly and low-poly version of a 3D weapon in Maya and ZBrush
- Utilise UVLayout to easily unwrap your model
- Generate floaters to use them as a mask
- Texture a real-time asset using PBR techniques in Substance Painter 2
- Make a beauty shot of your asset using Marmoset Toolbag 2

Concept

With this project, I was aiming to create a high-definition weapon for videogames based on the famous .44 Magnum built by Taurus.



Create an HD weapon for games

The goal of this project is to study in detail the entire creation process of an HD game asset, from the baking process to the final PBR texture with the help of Substance Painter

In this tutorial, we will see how to make a photorealistic 3D weapon based on the Raging Bull .44 Magnum from Taurus. You will learn how to make a real-time 3D game asset, respecting all the constraints that are associated with the production of current-generation videogames.

We will go more in depth in the use of powerful tools such as Maya, ZBrush, and Substance Painter, and will attempt to highlight tips and tricks that could save you a lot of time in the process. We will cover all the different steps, from the low-poly in Maya, to the high-poly mesh in ZBrush, to the final PBR texture in Substance Painter, passing by the UVs in UVLayout. All the steps are very detailed, but don't stop trying to push your skillset by studying user guides or by watching other 3D content on the internet.

To get better and better results, it's crucial to feed your eyes with other 3D work, good references, photos, or by watching your environment everyday. After all, observation is key when it comes to creating realistic 3D art, and we will see how our attention to detail will help us to deliver a render with a very high level of realism.

01 Find references First of all, to be as accurate as possible with the original weapon you need to have a lot of references. Look on the internet, and take all images you can find about the chosen weapon, including blueprints, photos and close-up videos. Try to find all the different angles of view to be able to reproduce it in 3D. The more pictures you have, the easier it will be to reproduce the different shapes later on. It's a very crucial step in this creation process and the base of your success, so I truly recommend you spend plenty of time on this step before going any further.

02 Block out the gun Once in Maya, create planes and use them as a template for your gun. Pick two or three key references, such as a side, a front or a back view and apply them to your planes. Make sure to keep a good size ratio between all your planes and, once again, don't hesitate to spend time on this step. Start to block out the main shapes, and try to identify the different parts you'll have to separate. In our example, you can see that the barrel, the handle and the cannon can already be separated. It's very important to precisely follow your reference and the outline, but also the different lines and curves to achieve a realistic result in the end.





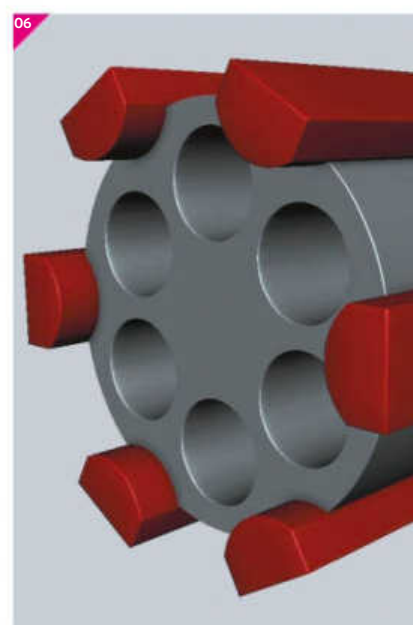
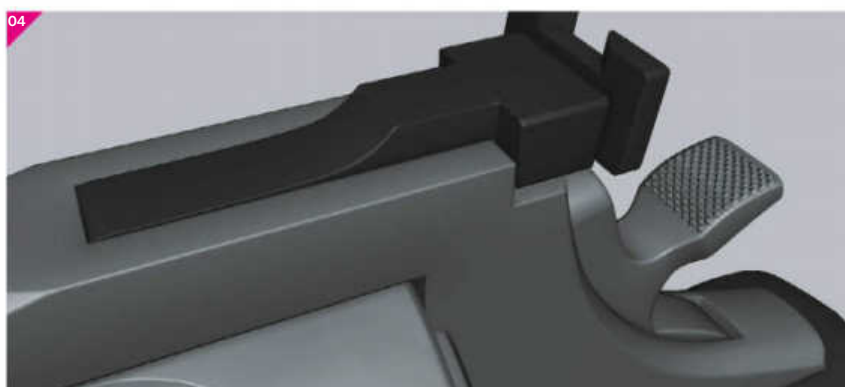
03 Detail the mesh Start to refine the model by separating and adding all the smaller pieces, including the rear sight, the front sight, the trigger, the hammer spur, and so on. Finding pictures of the inside of your gun will greatly help you to understand the shapes and how it works, especially for the recoil shield and the hammer. At this stage, if you realise that you need more information to keep detailing your gun, go back to the the first step of this tutorial and keep searching for more references. The less you have to improvise to read the shapes, the better result you'll get.

04 Smooth and crease Once your mesh is detailed enough, it's time to smooth it. Use the 1, 2 and 3 keys to switch between the different Previsualization modes in the Maya viewport. Don't hesitate to add Edge Loops and adjust the shapes if necessary. The best technique to keep hard edges and smooth surfaces is to use the Crease tool. To find it, go to the Edit button in the Mesh Tools menu. Once you've activated the Crease tool, select all the edges you would like to keep hard, then use the middle mouse button to define the hardness of your edges. In our case, I recommend to use 0 or 1 for the value. We will see in the next steps how to soften these sharp edges in ZBrush.

05 Smooth in ZBrush Export all your elements from Maya to ZBrush using GoZ. By using this free plugin, you'll be able to keep your crease information that was previously assigned in Maya. Once your gun is fully imported, you can start smoothing it using the Divide option present in the Geometry sub-palette in the Tool menu. To have the perfect control on your creased edges, set the Crease level in the Crease sub-palette. Here you have 15 levels available. If you divide your mesh at level 0, the mesh will be smoothed as there is no crease information. If, however, you set the level to 15, edges will stay totally sharp. The technique you'll need to get nice smoothed bevels is to smooth multiple times at level 15, then set the level back to 0 and divide again to soften the sharp edges and only affect their roundness. With this perfect control between smoothness and hardness, you'll be able to adjust the way that your edges respond to light perfectly, which is essential for the texturing and render steps.

06 DynaMesh sub Once you've smoothed all your SubTools, we're going to experiment with a technique that I've massively used on this project. This method will basically save you a lot of time and give you a perfect result on your mesh. As an example, let's take a look at the barrel. As you can see on the reference, the shape is really complex, with round elements subtracted from others. In Maya it can become a real nightmare to deal with this sort of topology, so in order to avoid any problems, I've decided to tackle this directly in ZBrush using a subtractive approach with DynaMesh.

I created basic primitive shapes in Maya that I've positioned at the right place around the barrel. Then I've imported them in ZBrush in order to use them as DynaMesh sub elements. To mark them as DynaMesh sub elements, go to the Polygroups sub-palette in the Tool menu. The process is pretty straightforward – simply merge all your elements together and click on Autogroup. Isolate the DynaMesh sub elements and mark them. Then display all the parts and rebuild your DynaMesh using the Cmd/Ctrl key. Note that you need to have the Groups option activated in the DynaMesh parameters to make the DynaMesh sub function works.



“With this control between smoothness and hardness, you'll be able to adjust the way that your edges respond to light perfectly”

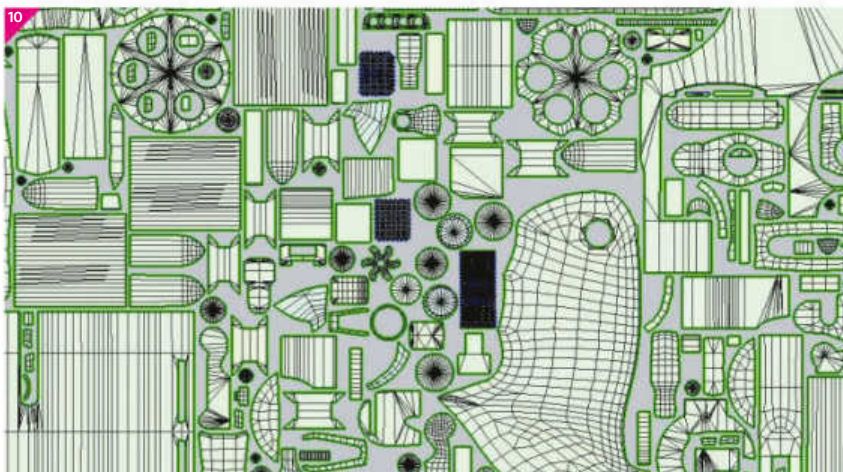
Make floaters

Serial numbers, typography and logos are all important elements when you replicate a real weapon, especially if you're aiming for total immersion and reality in your model. To easily create 3D text in Maya, go to Create>Text>Text Curves option. Once in the Window option, enter the word or number you need. Choose the font. Flag Poly and select between Triangles or Quad. Click Create. Once you've deleted the history and freeze transformed the mesh, you'll be able to edit it.

In our case, you can see that outlines were created around the text to have the desired effect. For the logo, you can import a picture in Maya and trace it using polygons. But you can also use Adobe Illustrator to generate a vectorial spline of your logo. Go back to Maya, use the option Adobe Illustrator Object to convert your splines into meshes.

Hard Edges and UVs

Before baking a HD mesh on an LP mesh, it's important to follow some strict rules. First, to avoid any distortion in your baking, you need to apply Harden Edge in Maya whenever an angle changes more than 45 degrees. The rest of your mesh has to be totally smooth. Second, anytime you have a hard edge, you must have a cut in your UVs. Let's take a look at a simple example with a 3D cube. If you follow our first rule, you should only have hard edges, and in your UV Editor only detached faces. If you experiment with this little exercise, you'll see that the baking will be absolutely clean. In 3D each case is different and even if you'll have to adapt, assuming you use these two golden rules you should have nice Normal maps no matter what the shape is.



07 Clean and refine When you've finally finished subtracting all your different elements, it's time to clean the little imperfections you may have in your meshes. In order to achieve this, use the hPolish brush to smooth all the pinches and irregularities you might have here and there. If some issues persist, don't hesitate to DynaMesh the mesh to rebuild your topology. Try not modify your flat surfaces too much, as you'll want to avoid bump effects. Use the Planar brush to soften these flat surfaces if necessary. Note that at this stage you can still adjust organic shapes, such as the handle, by using the Move brush, for example.

08 Decimation To be able to have a good base for your retopology, we need to decimate our current HD mesh to avoid any performance issues later in Maya. To do so, go to ZPlugin>Decimation Master and select one of your SubTools. Click on Pre-process Current. Set the percentage of decimation you want, then click on Decimate Current. Do remember that the decimation process can take quite a bit of time and depends of the complexity of your topology. Be sure that you're not being too extreme and to preserve all the details that you've created. It's really important to keep a nice, smooth and rounded shape. Save all your decimated SubTools as OBJ files and import them in Maya.

09 Retopologise in Maya Once your decimated mesh is in Maya, select one of your pieces that you want to retopologise and click on the last magnet on the right to make your object Live. By activating this option, you'll have the ability to use it as a guide for your low-poly model. Now, whenever you move vertices, edges or faces, they'll get automatically snapped to that surface as long as the decimated mesh is marked as Live Object.

Try to keep your topology homogeneous and be careful to preserve the silhouette of your shapes. A planar face or a straight line can be totally optimised but, on the contrary, rounded shapes need to have enough polygons.

10 UVLayout Once your low poly is done, merge it and export it as one single OBJ file. On this project I decided to use UVLayout to unwrap my model. The program might not seem particularly user-friendly the first few times that you use it, but once you've learnt the basics and the main shortcuts, everything becomes much easier to use.

Let's see some examples of shortcuts that could be useful, but do bear in mind that in this program, the cursor of your mouse defines what you're going to interact with. Put your mouse over an edge and use the C key to select it. To unselect it, click on the Backspace key. To cut a selected edge, use the Enter key. Pressing the spacebar and holding the middle mouse button at the same time allows you to move objects. The D key will send your piece to the 2D view/UV view. To display it, press the U key.

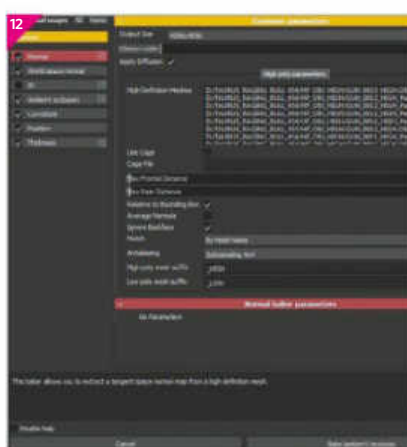
All these shortcuts and many more can be found in the User Guide of the UVLayout website – simply head online to this website: www.uvlayout.com/doc/User_Guide:_Hotkeys.

“UVLayout might not seem particularly user-friendly, but once you've learnt the basics, everything becomes much easier to use”

11 Set up a naming system Before baking in Painter, let's take a look at our naming system carefully. In Painter, you have the ability to activate an option called Match. You can then select Always or By Mesh Name. With Always selected, all your separate elements will be baked together. It can be useful, but in our case we will have overlap issues during the projection process and we'll get errors and artefacts in the Normal map. With By Mesh Name selected, you'll be able to define which parts are going to be baked together as if they're isolated. To proceed, you need to strictly set up mesh names by adding a suffix in order to enable Painter to recognise them. In our case, GUN_001_LOW will match with GUN_001_HIGH. Following the same example, if you need to bake multiple HD meshes on one single LP mesh, you'll find that GUN_001_LOW matches GUN_001_HIGH_Part1, GUN_001_HIGH_Part2 and so on.



12 Bake in Painter Launch Substance Painter and click on File>New. A New Project window will pop up. Set the Template as 'pbr-metal-rough-HQ' and press Select to import your low-poly mesh. Remember that you have to import a single FBX or OBJ file. To keep all your part separated, select all your elements in Maya, and then click on Export Selected. You can also group them in Maya and export the group. Once your mesh is in Painter, it's time for baking. Click on the Bake Textures button in the TextureSet Settings tab and set the baking window. Don't forget to import all your high-definition meshes with the correct name and suffix. We will see how to use ID Maps later in the process, so for now, don't load your floaters in the HD Meshes list and don't forget to uncheck the checkbox next to ID.



Speed texture

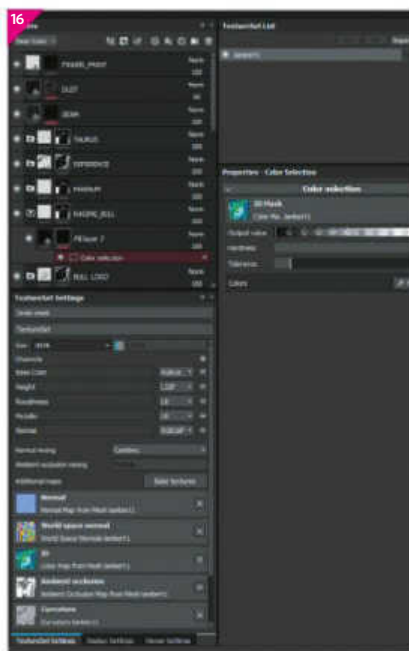
Substance Painter is probably the best texture program to experiment and iterate quickly. From making variants of the same model to changing the artistic direction of your asset, everything is possible with astonishing ease. Don't hesitate to prototype different versions of your weapon by playing with the Masks Generator and by mixing Smart Materials together. Start with the macro details and finish with the micro for an awesome close-up shot.

13 Masks and groups When working in Substance Painter, it's really important to stay organised. Your stack of layers in the Layers tab works pretty much like it does in Photoshop, with blending modes and opacity parameters. If you start to accumulate too many layers, you'll find that you can easily lose control, losing track of which filter is doing what and so on. To avoid this issue, I recommend grouping by material. In our case, we have the rubber of the grip, the steel of the frame, the black metal of the rear sight, and a sort of gold embellishment for the logo. Create a Fill layer and add a black mask on it. Press the 4 key to switch to Properties>Polygon Fill. Then use the different Fill modes to isolate your parts of the mesh. Change the colour of the Fill layer with a distinctive one and repeat the process for all the different materials.



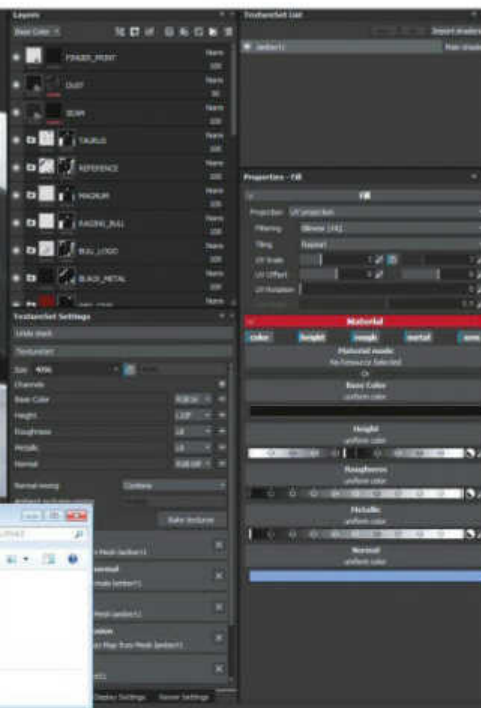
14 Detail the material A key to achieving photorealism is to tell a story with your asset. To do so, imagine how the gun could have been used. Maybe the weapon has been forgotten in a granary full of dust, or the owner of the gun lives in the desert, so it could be stained with dirt. It is your call to give a background to this asset and will definitely make all the difference. Now that you've masked all your parts, you can start replacing all the different Fill layers with materials - like before, don't forget to stay close to your reference imagery. For the metal of the barrel, I mixed different materials together by changing their opacity. Adding Smart Masks for certain areas, such as the gun's edges, can be a very good way to break the regularity and to create a certain level of wear and tear damage on the borders. Proceed the same way for the other types of materials until you get some kind of uniformity and consistency between all the parts.





“These details will also add a lot of little snippets of visual information that will increase the overall realism of your picture”

15 Micro detail pass Once you're satisfied with your base material, it's time to add another extra detail pass. This time, these details will be mostly visible in close up, but they will also add a lot of little snippets of visual information that will increase the overall realism of your picture. Create a new Fill Layer and add a black mask. Now go to the Alphas shelf and select the Greyscale Fingerprint map. Go back to your mask and stamp them in logical places. Try to stay realistic with the orientation and aim to be consistent in the size of the different fingerprints. Obviously don't forget to make them match with the ratio of your weapon. Select your Fill layer and remove the Color and the Normal channel. What we want here is just to add some variation in the Roughness and the Metalness. Tweak the intensity until you get the desired effect. Around the barrel, you can add a black powder effect by masking out the faces of your mesh that you want to darken, then applying a Smart Mask on an almost black Fill Layer.



16 ID maps and floaters To use the floaters that you've created in Maya, go back to the Substance baking window and add your meshes in the High Definition Meshes list following the correct naming system we covered earlier. This time, only check the ID checkbox. Don't forget to go to the ID Baker parameters and select Mesh ID for the Color Source and Random for the Color Generator. Now that you've got your ID map, let's learn how to use it. Create a Fill layer, Ctrl/right-click on it and add a mask with colour selection. Now if you select your mask, a new colour selection line will appear in your layers. Click on it to display the properties. The Output Value allows you to set the opacity of the black-and-white mask. Adjust Hardness and Tolerance to tweak your selection. Next, pick Color to select a colour in your ID map. Once you've set your mask properly, go back to your Fill layer to adjust the colour, height, Roughness, Metalness and the NRM parameters. Proceed the same way with the rest.



17 Create your own custom Alpha map If you look at the reference, you can see that the Taurus Raging Bull .44 Magnum has very specific elements carved on the rear sight. To add these little details, go to Photoshop and create a 1,024-pixel square document. Fill it in black, then use the Text tool to create letters. Make the two arrows using the Rectangular and Elliptical Marquee tool. Then export the four Alpha maps as PNGs. In Substance Painter, you just need to drag and drop your files in the Alphas shelf to specify a location on your computer and add them to your library. Now create a new Fill Layer, add a black mask, select one of your custom Alpha maps, go to Paint>Properties, set the Greyscale value to pure white, adjust your viewport and finally stamp your Alpha directly in your 3D view. You can also use the 2D view if you feel more comfortable. In Fill>Properties, tweak the Height map value to have a nice, carved effect. For the specific pattern of the grip, I used Substance Designer to make a custom Height map. Once in Substance Painter, I just used the map in combination with a Fill layer and mask to have a similar bump effect.

Build a custom scene for Sketchfab

Sketchfab is a website used to display and share 3D content online. It provides a 3D model viewer based on the WebGL technology that allows the display of 3D models on any mobile, desktop webpage or VR headset. The viewer surpasses Marmoset's viewer exporter in many points, and unlike the Toolbag exporter, the maps are not degraded and the lighting allows you to have up to three directional casting shadow lights. It quickly became a part of my workflow and is, in my opinion, the best tool to showcase your 3D work online. I personally chose to create a dedicated scene for this gun project in Sketchfab. I created bullets and made a quick pose in Maya to have a sort of realistic stage. Once uploaded on Sketchfab, I just had to import my textures, work on the lighting and then the post-processing to get some great-looking results. If you want to take a closer look at this scene and check out my previous work, head to my Sketchfab page by typing www.sketchfab.com/jonathanbenainous into your browser.

18 Import in Marmoset Now that your textures are finished, go to File>Export Textures. Set the path to the desired folder, the file format, choose 4096x4096 for the Document Size and click on Export. In Marmoset, import your mesh by pressing Ctrl+B, and create a New Material by pressing Ctrl+M. In the Surface slot, load your Normal map. Painter uses OpenGL, so don't forget to click on Flip Y in Marmoset to have the correct result. In the Microsurface slot, load your Roughness map. Once again, don't forget to check the Invert checkbox. To load your Metallic map, go to the Reflectivity slot and switch it from Specular to Metalness. Set the reflection to GGX instead of Blinn-Phong, then load your Albedo and ambient occlusion. Apply your material by dragging and dropping the material sphere directly onto your asset.



19 Light and render in Marmoset Now that your scene is set properly, go to Scene>Sky Browser and select an environment to suit your gun. For mine, I used Indoor Fluorescents to have a sort of studio-lit effect and a soft balance between colours. You can also use a flat colour as a background, or a very neat environment – it's totally up to you. In our case, I changed Mode to Blurred Sky and I set the Backdrop Blur to 0.1. Note that you can use the Shift key in conjunction with a mouse click in order to rotate the Environment map and change the direction of your lighting. In the Light Editor, add lights by clicking directly on the Sky map. Don't forget to check Cast Shadows and Contact Refinement for a better result. I recommend that you start by choosing a good camera angle before adding new lights. This is because you can highlight all the details much more easily, adding rim lights and so on. In the Lighting tab in Render, it's important that you don't forget to check Local Reflections, Ambient Occlusion, High-Res Shadows and Front-Face Shadows to get the best quality. Add the final touches by adding post effects into your Camera options, such as Bloom, Vignette, Depth Of Field and Chromatic Aberration.

Showcase

Jonathan Benaïous

Jonathan started in the videogame industry almost ten years ago as a 3D artist and environment artist. He has a passion for creating a wide range of images, including vehicles, environments and lighting. He also appreciates high-tech and hard-surface works.



San Mateo & Agua Verde Provinces - Ghost Recon Wildlands, 2016

3ds Max, ZBrush, Photoshop

As coordinator and principal artist, I was involved in creating the different landmarks in the scene.



Rosario Prison Village - Ghost Recon Wildlands, 2016

3ds Max, ZBrush, Photoshop

For Ghost Recon Wildlands I was in charge of creating this village, the layout, the world building, and also the most of the rocks in the background.



Carzita Island - Ghost Recon Wildlands, 2016

3ds Max, ZBrush, Photoshop

For Ghost Recon Wildlands I was in charge of creating this island, the house itself, but also the terraforming and the rock placement.

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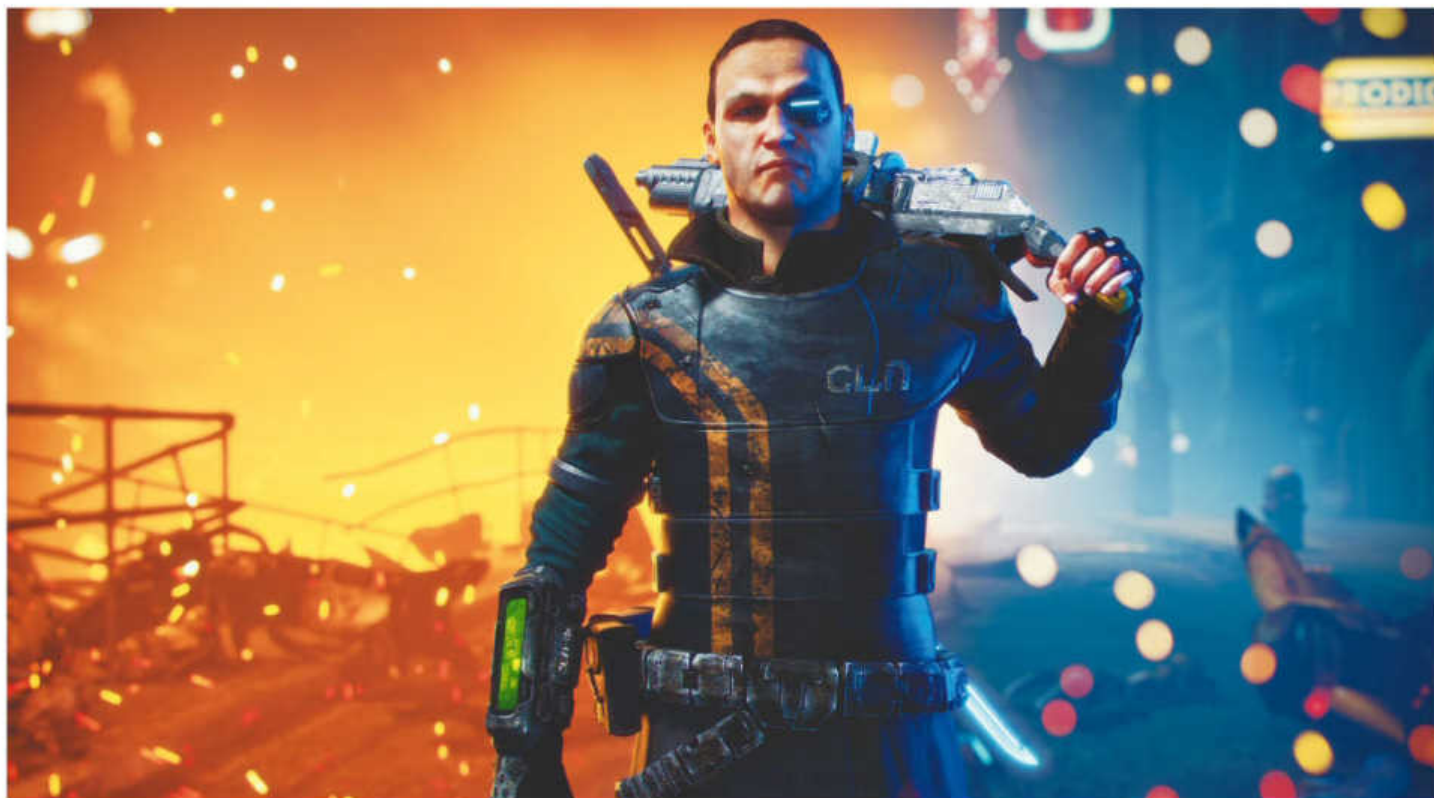
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Our experts

The best artists from around the world reveal specific CG techniques

Fusion

Tom Hankins
www.colorbleed.nl



Tom is co-founder of Colorbleed, completing everything from advertising projects to game cinematics

Sketchfab

Paul Chambers
paulchambers3D.com



Paul is a freelance CG generalist based in NYC. Paul also works at www.sketchfab.com as artist evangelist

FUSION

Composite a game cinematic

Back in 2011, I was just another VFX student. After being inspired by Pixar back in high school, I'd decided to begin studying computer animation and, like many others, completed a final graduation short together with a few friends in my last year. We called it 'Mac 'n' Cheese'.

Ultimately, our hard work on the final short really paid off. To our complete surprise, 'Mac 'n' Cheese' went viral, and before long, we even had several potential clients asking whether we were a studio and offering us work. That's when we decided to start our own creative production agency, Colorbleed, and we've been lucky enough to work on projects together as friends ever since.

In this guide, I'll go through how our team completed the final look for one of our most exciting projects yet: our very first game trailer for post-apocalyptic single-player shooter, *Hard Reset Redux*. We only had six weeks to complete the entirety of our work on the action-packed trailer, which introduced the two main characters in the game through an exciting chase sequence and explosive battle, building up the tension before seamlessly transitioning to in-game footage. Using Fusion, we went from raw Maya character and environment renders to a look that included effects, such as depth of field, glow, and smoke, compositing them to create a final result that would impress our client in record time.

01 Render your character The first step was to render several passes of our character to ensure optimal control in the final comp. Creating the character itself was made much easier thanks to the game development team, who provided us with their ZBrush character models, complete with textures to use as reference.

We would simply take the high-res model, reproject all the low-res textures on it, then repaint extra details to make the textures appear high resolution again. Here we used Fusion for combining all of our Displacement maps. If I needed to update the Displacement map on a character's face due to different pore placement, for example, all I needed to do was update my Fusion graph. Ultimately, I was able to write out an 8K Displacement map for an entire character straight out of Fusion. These Displacement maps were plugged into various shaders, from SSS skin materials for flesh to metal, rubber and fabric for clothing and mechanical parts.

02 Merge with a background The next step involved merging our character with the background. For the environments, we were provided with both maps and models that we could reuse by the game development team, which made the process of creating backgrounds much faster and easier. We would typically render a Color pass and a couple of



“For slow shots with no intense movements, we were able to render the character and environment together”

shadow passes from Maya, then perfect the rest of the image directly in Fusion through some clever compositing, without any need to add extra complexity through specular highlights or SSS passes. For slow shots with no intense movements, we were sometimes even able to render the character and environment together, and use multiple Mattes to then separate the two from each other. We used simple RGB Multimatte passes and the separate channels as masks for Color Correction nodes, for instance. The main character would be in the R channel, the robot would be in the G channel and the environment would be in the B channel. Sometimes we would break it down even more and separate a character into different Mattes, too.

03 Add fog We added fog next to give the scene a moodier overall feel. We did this by importing a fog render as a separate layer, which gave us maximum control in post. This was essentially a Maya fluid rendered with V-Ray's Phoenix shader. In post we could then decide how much influence we wanted the fog to have. We also experimented by doing things such as bumping up the Contrast, or colour correcting the fog in Fusion before applying it to the final comp. Fog can also be created directly in Fusion by using the Fog 3D tool, Volume Fog tool, and Fog tool in Tools>Deep Pixel. This can be used in conjunction with SoftClip, which takes in the distance of a pixel from the viewpoint to affect opacity, allowing objects to gradually fade.

04 Play with motion Once the overall feel of the environment was set, we then focused on effects, such as Motion Blur, to enhance the realism in the animation of the action sequence. First, we rendered a Velocity pass from V-Ray. Because V-Ray outputs for use in plugins such as ReelSmart as default, however, the middle value representing no motion blur is 0.5. This was an issue because Fusion's Vector Motion Blur node will interpret 0 as no motion. To adjust for this, we subtracted -0.5 from our Velocity pass before plugging it into the Vectors input of the Vector Motion Blur node. I then used a Custom Tool, switched to the Channels tab and set the Red Expression to $r1-0.5$ and the Green Expression to $g1-0.5$. We then plugged the Custom Tool output into the Vector Motion Blur node and set the X channel to red and the Y to green. The last step is to play with scale to finalise the Motion Blur effect – I usually go for 0.25 for normal scenes down to 0.1 for heavy movements. Remember to always render your Velocity pass without filtering for proper results.

05 Depth of field effects The depth of field illusion was added using Frischluft Depth of Field and out-of-focus effects with a specific bokeh to generate a more realistic final result through a very shallow depth of field. Keeping the focus close with a small falloff makes the shot more mysterious. Colours were lifted through added layers, based on Z-Depth channels to separate the character from the background even more. This created a nice silhouette effect.

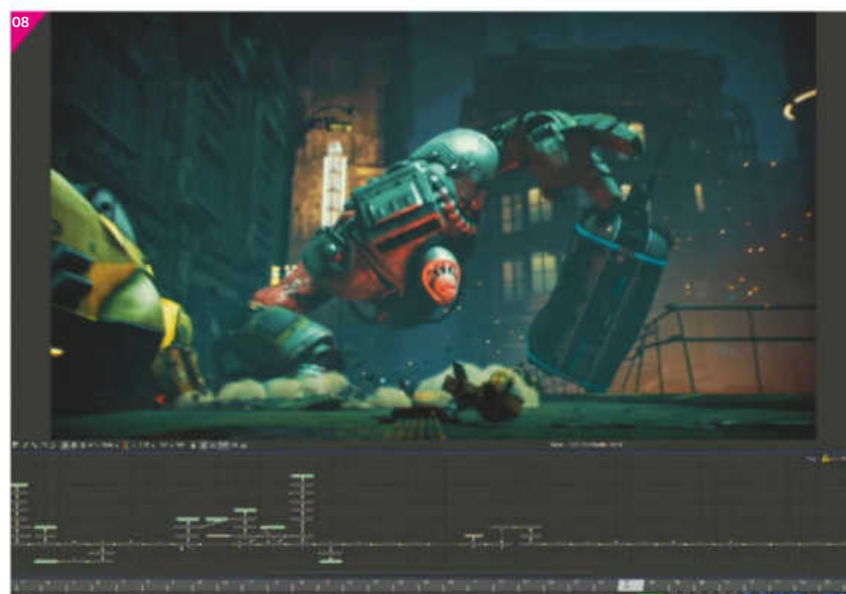
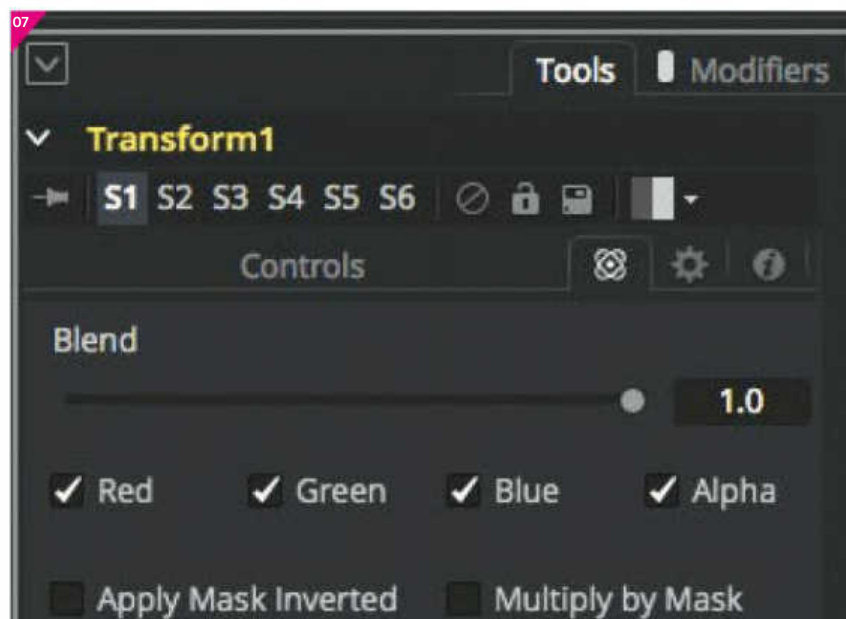


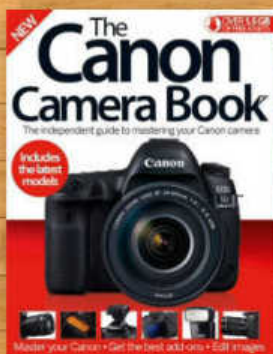
06 Dust and sparks Volumetric dust was then rendered separately, as well as sparks, to add some extra detail to the scene. For some shots, we even added 3D and 2D stock footage to enrich the scene. To blend these details into the rest of the comp, we used an Object Property set with a couple of overrides in V-Ray to tell all our geometry, as well as other elements including hair, particles and curves, to cut out the Alpha. This way we were able to layer elements like dust on top, for example, and they would blend perfectly.

07 Camera shake Next, a camera shake effect was applied. I used Fusion's Transform node for this. Ctrl/right-click the Centre option and choose Modify With>Shake. Here you can adjust the Smoothness – I decided to go for a low value close to 1 for fast shakes. You can see Min and Max value as the input value, not as an offset. If you want no shake at all then you need values of 0.5 and 0.5 to keep the frame centred. I like subtle shakes, so I went for Min: 0.49 and Max: 0.51. You can do the same for the Rotation value. Just click the Angle option and modify with a shake too. Keep this even more subtle at Min: -1 Max: 1. Back in the Tools tab, ensure you then select the Wrap or Duplicate option under Edges to avoid gaps on the edges of your comp. You can also scale the image up with the Size option. Lastly, I would recommend enabling Motion Blur, too, for added realism.

08 Add in glow From the beginning, we were using *Blade Runner* as one of our main references and sources of inspiration for *Hard Reset Redux*, so we aimed to add plenty of vignettes, chromatic aberration and glow effects to the final shots. To do this, we used Fusion's Soft Glow tool with the High threshold set to 0.9 and a small glow size of between 2 and 5 to add highlights, and a FuseGlow tool to blend the surrounding pixels together in a subtle way. This is basically a blur with a large value of about 20-50 with a low blend of about 0.05-0.2. This render element was used to exaggerate the neon lighting in the shot. Finally, a Highlight Filter node with Curve set at Standard, Length at 0.5 and Angle at 45 was used to boost the illumination.

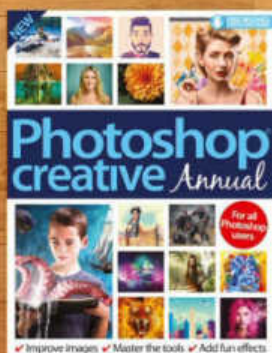
09 Final colour correction Our final step was to give our trailer a cinematic colour grade using a File LUT node, which allowed us to import a cinematic LUT, which you can download online. Some are free, others you need to pay for. We then added several Color Corrector nodes and a Color Curve node to ensure our final shots had a nice contrast while keeping blacks and whites intact.





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BLENDER, SKETCHFAB

Create a VR experience with Sketchfab

As an artist you can't afford to miss out on developing creative skills in virtual reality. As the popularity of VR grows, each day demands new experiences – those are more opportunities for VR-ready content that you could be helping to create. But with high-end video cards and headsets costing a premium, how can you gain some initial VR experience before investing in hardware?

Thankfully you can start creating immersive VR experiences with just the smartphone in your pocket, a Google Cardboard and the 3D software you're already familiar with. By uploading to www.sketchfab.com you can publish to VR, test what you make, and share it with others without needing to invest in any additional software.

Developing for mobile VR comes with a particular set of challenges regarding scale, movement and, in particular, optimisation; coaxing the hardware in your pocket to deliver a smooth, steady frame rate. This takes planning and optimisation, but these are valuable disciplines that translate to developing effective VR for more powerful headsets when you're ready to invest. In the following tutorial you'll learn to create and immerse yourself in your first VR experience.

01 Develop a concept Where will VR take you? To the bottom of the ocean? An orbiting space station? Inside the human body? If ever there was an excuse to visit somewhere you normally couldn't, it's VR. Think about an experience that plays to the paradigms of virtual reality that tend to be a series of standing experiences with interactions and immediate surroundings within arms' length and where movement is often point-to-point using teleportation. It was this paradigm that led me to develop the notion of a series of floating islands. As well as the scene, don't forget to think about what's above and below the participant.

02 Decide on a look VR of any flavour, but particularly when delivered by a mobile device, needs to be highly optimised to keep movement fluid and participants immersed and comfortable. This means keeping real-time lighting, material count and material complexity to an absolute minimum. Imagine developing a 3D mobile game for the first generation of smartphones and you're in the right ball park when it comes to scene, lighting and material limitations. Use these limitations to challenge yourself to create imaginative worlds that rely on style more than photorealism. Low-poly modelling and bold use of colour are your friends here.

03 Set up a blocked scene Start blocking out your scene to human scale with a simple single material. Make a basic human figure to place around your scene as a proxy for the participant. Use simple primitives and look for opportunities to billboard distant geometry that won't be accessible. Connect your Sketchfab account and upload your initial scene. On Sketchfab's website, visit the 3D Settings for your scene and use the VR tab to place the initial position and point of view of the VR participant and make sure the scale is set to mirror the scale of your scene in your 3D software.

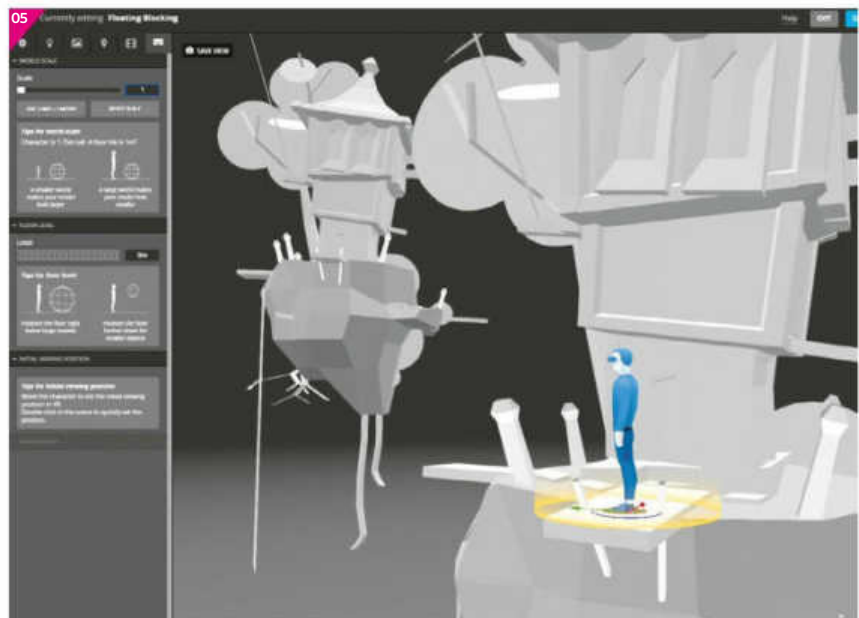
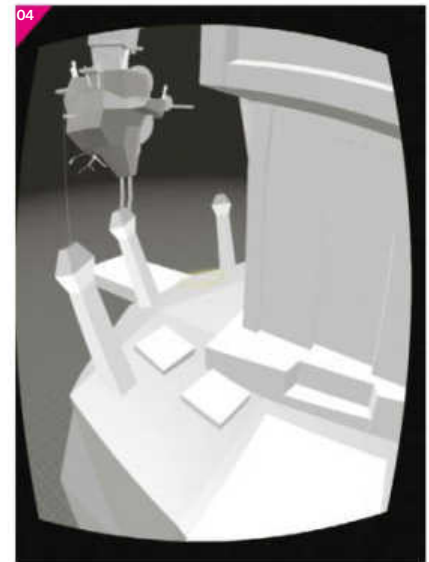
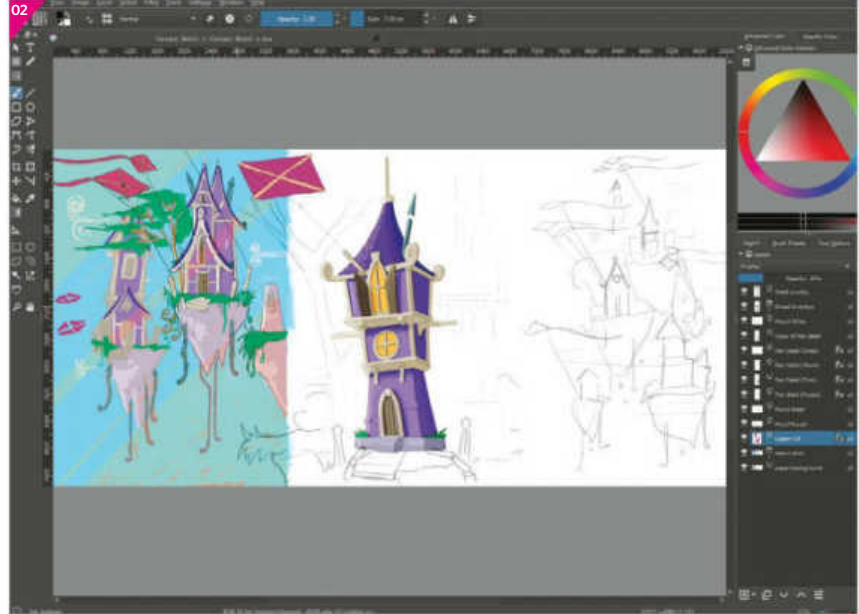
04 Initial exploration in VR Sketchfab VR works directly in a browser and doesn't require any special app to download, so grab your smartphone and visit the URL of your Sketchfab scene. Tap the goggles icon and drop your phone into a Google Cardboard or similar headset. Congratulations, you're in your VR scene! Tap the Cardboard button whenever a circle appears and you can teleport to that location. Look around. You'll immediately begin to learn so much about your initial blocking. What did you build too large? Too small? Which paths are blocked? Is there visual interest in all directions? Invite a friend to test.

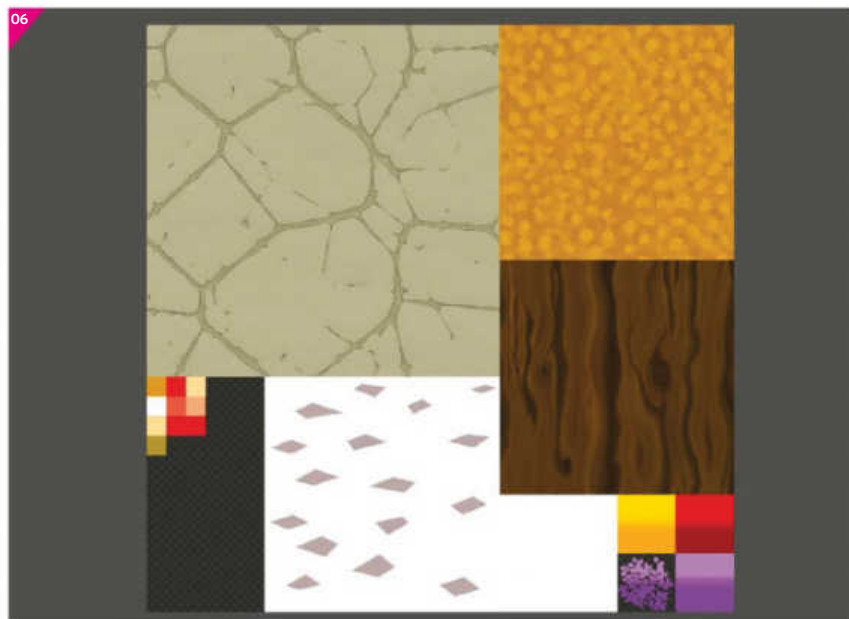
05 Adjust, test, and explore further Start refining scene geometry. We'll aim for modular geometry later to keep texturing efficient, but for now block out more geometry to test movement, scale and distance in VR. Hop back and forth between modelling, uploading and testing on your phone. If you've begun to set up scale, environmental lighting or basic materials for your scene on Sketchfab's site and want to keep the settings, you can opt to reupload over an existing scene using the Reupload option on the Model page rather than the Exporter plugin. This will update the geometry but leave all other settings intact.



Grab a Sketchfab exporter

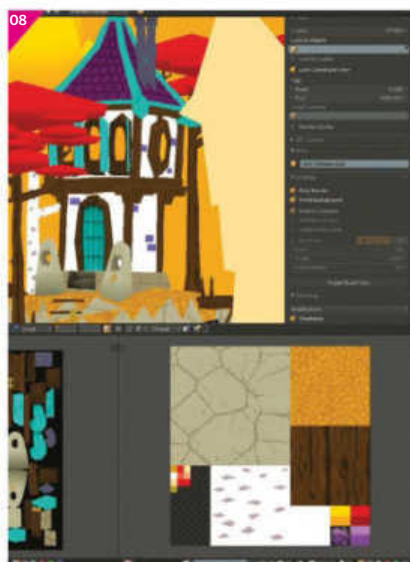
Sketchfab has exporter add-ons and plugins for all the major 3D software packages, and also supports drag-and-drop upload of over 30 file formats. Head to www.sketchfab.com/exporters to grab an exporter for your software. Some packages like Blender come with the exporter already pre-installed. If you don't already have one, set up your account at www.sketchfab.com and use the unique API key you are assigned on your account page to tether your exporter in your software to your Sketchfab account for one-click uploading.





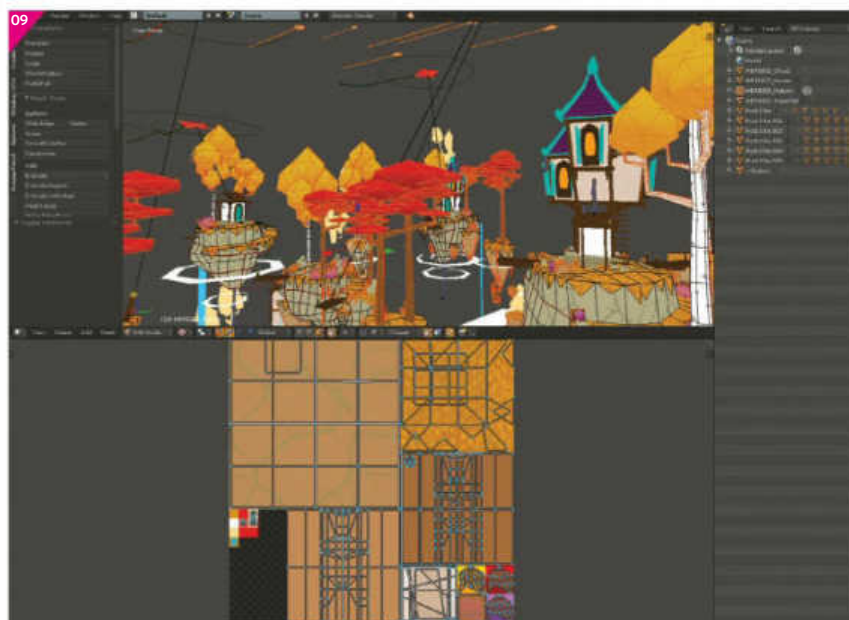
Material testing with Sketchfab

The browser-based 3D Settings interface for your scene on Sketchfab allows you to quickly edit materials and get real-time feedback. Even though it won't be an optimal material count for your final scene, consider setting up multiple material assignments in your modelling software at a part way point in your project. These materials can then be quickly adjusted and tested. This is a great way to try several colour schemes and quickly refresh them in VR without constant uploading, resaving textures or leaving your browser. It can also help you plan your final texture atlas needs in step 6.



06 Plan your textures Sketchfab supports a PBR workflow, but when it comes to textures for mobile VR, limit yourself to an Albedo and one other map. It could be Metallic or Roughness, but I recommend using a Normal map to gain the most amount of additional detail economically. Look for geometries that can use tiled rather than UV textures. Ultimately you'll use a mixture of both, but plan on sticking to two to three 2K maps rather than several smaller ones. Familiarise yourself with texture atlasing several tileable textures into one map. Again, this is all in the service of rigorous optimisation.

07 Build low-poly modularity With a plan for texturing in place, think similarly about optimised modelling. Look for opportunities to construct your scene out of modular pieces. While this may mean your final vertex count may be a little higher with some redundant geometry, minimising the amount of material calls and limiting texture memory is the ultimate aim here. Everything from man-made structures to organic environments can be built from smaller modular pieces and you'll find yourself breaking down components further as you progress. In total I used 50 modular components to build an entire scene across two Albedo maps and one Normal map.



08 Swap in the modular components Gradually introduce your modular components into your scene to replace the initial blocking geometry you developed. Periodically test your scene in VR, introducing a little geometry at a time to keep an eye on the frame rate. Aim for 50,000 vertices as your upper ceiling. Set up UVs for your geometry and pack them into as few textures as possible. Use your favorite texturing program to introduce colour to your scene. Try to avoid introducing UVs and textures too early because this can mean less-optimised texture maps. Sculpt and bake high-poly geometry as necessary to add Normal maps.

09 Final optimisation and upload Sketchfab provides optimisations to help mobile rendering, but there's more you can do to squeeze a few final frames per second of additional performance. In your modelling package, merge any geometries that share a common material before uploading your final scene. If you've used any rigged animation, look for ways to consolidate bone count to a minimum. If you've made textures at 4K or higher, create smaller versions to upload. Jump into the final scene settings on Sketchfab and play with lighting and post-processing to see what you can introduce or what you should eliminate to keep it smooth.

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Houdini FX 16

Intuitive tools based on a revamped core architecture make SideFX's app more artist friendly than ever

Houdini 16 from SideFX comes with a great collection of new features. Before we begin to look at these, it's important to consider what has happened under the hood, and hence what is not visible to the user. The developer has revamped the core architecture of the software, and as a result artists from all branches – from animators and modellers to VFX artists – gain intuitive workflows supported by highly optimised tools. In version 16 you get better access to the tools by using the radial menus in the perspective viewport – just like you know it from Maya. There is also no need to constantly switch from the perspective view to the Node Network Editor and Parameter Editor, which saves clicks.

The Node Network Editor itself shows the greatest improvement. A completely new design helps you to organise small and large node networks, but there is another great time-saver available – quickmarks. Finally, you can use a form of self-made bookmarks for positions in the Node Network Editor, where you can assign different nodes and positions to number keys.

There is another powerful tool in the repertoire called Boolean, which can be used to improve object preparations for simulations. Let's just take a look at destruction simulations – an area where Houdini is well known for its procedural approach, which offers richness of detail for artists who are well versed in technical art. In earlier versions you would take an object and scatter points onto and into it, or you used techniques to create points within a source object. Afterwards you take the Voronoi fracture tools to create fragments based on the point position, which will act as a centre for the Voronoi cells. These fragments can be used within the DOP context for the bullet simulation. The crux with this workflow is the correct shaping of the fragments

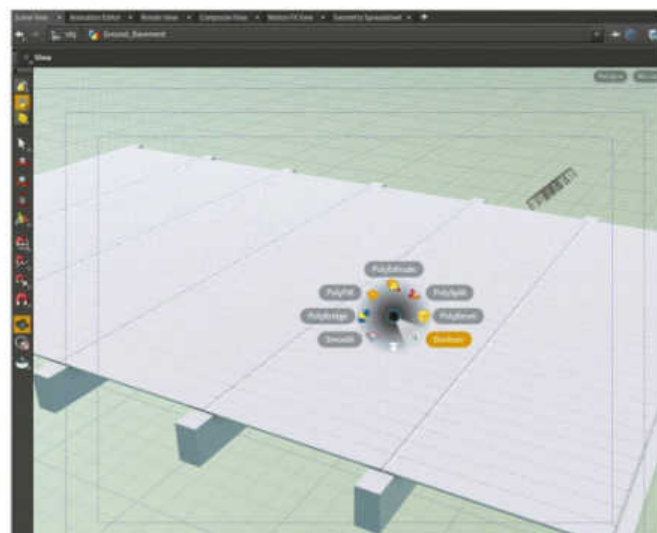
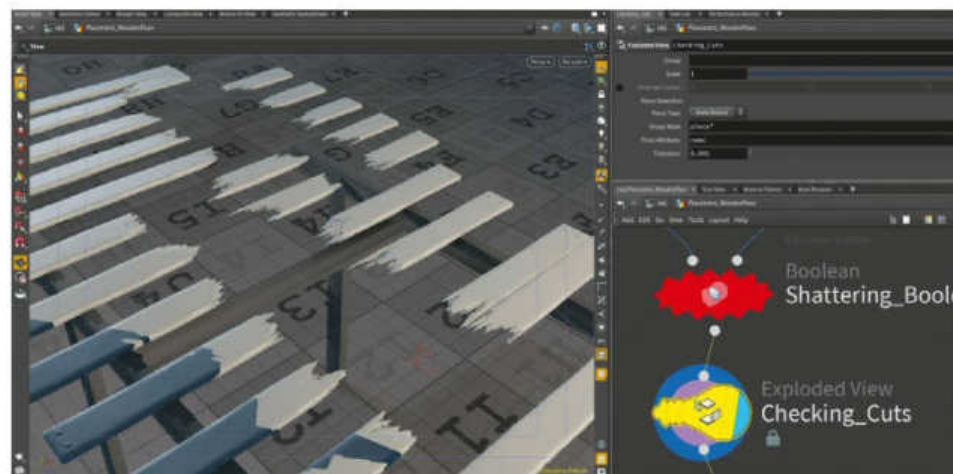
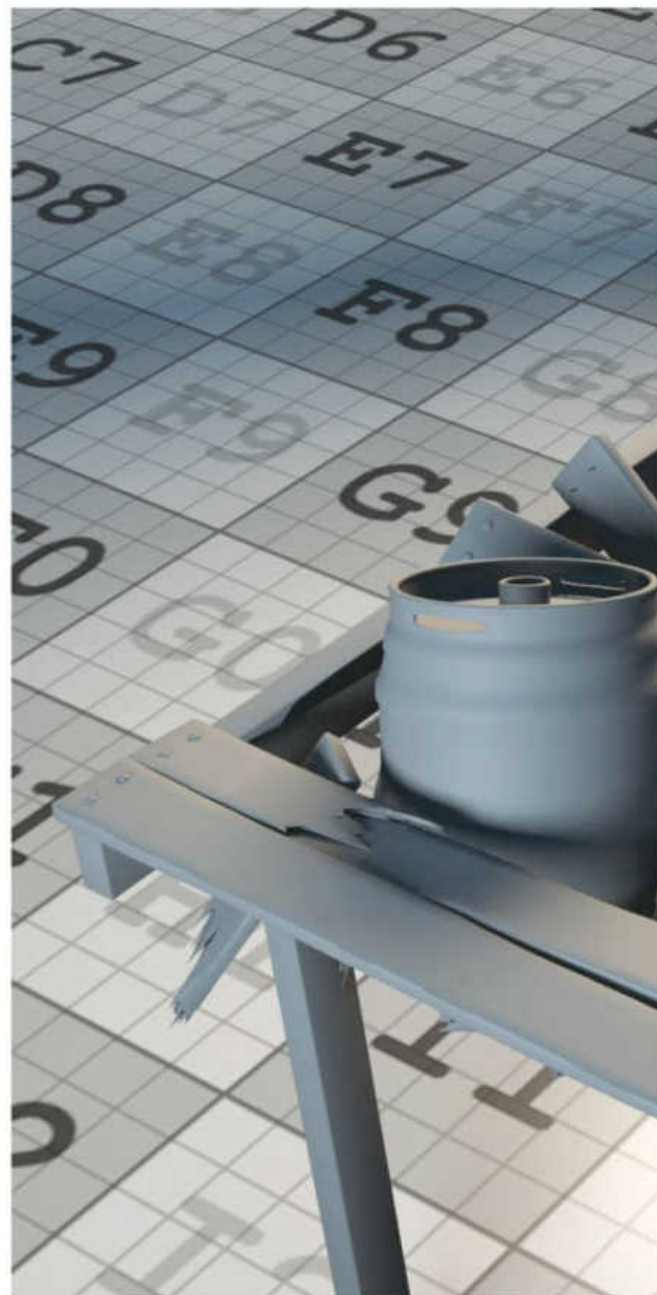
regarding their real-life behaviour. It is easy to create a nice-looking concrete-breaking simulation, but for wood it is going to be difficult. You can make a basic Voronoi setup just for a box, and before going into DOPs you can scale it up to a plank – but for a wooden house that would be an insane amount of work to set up the simulation.

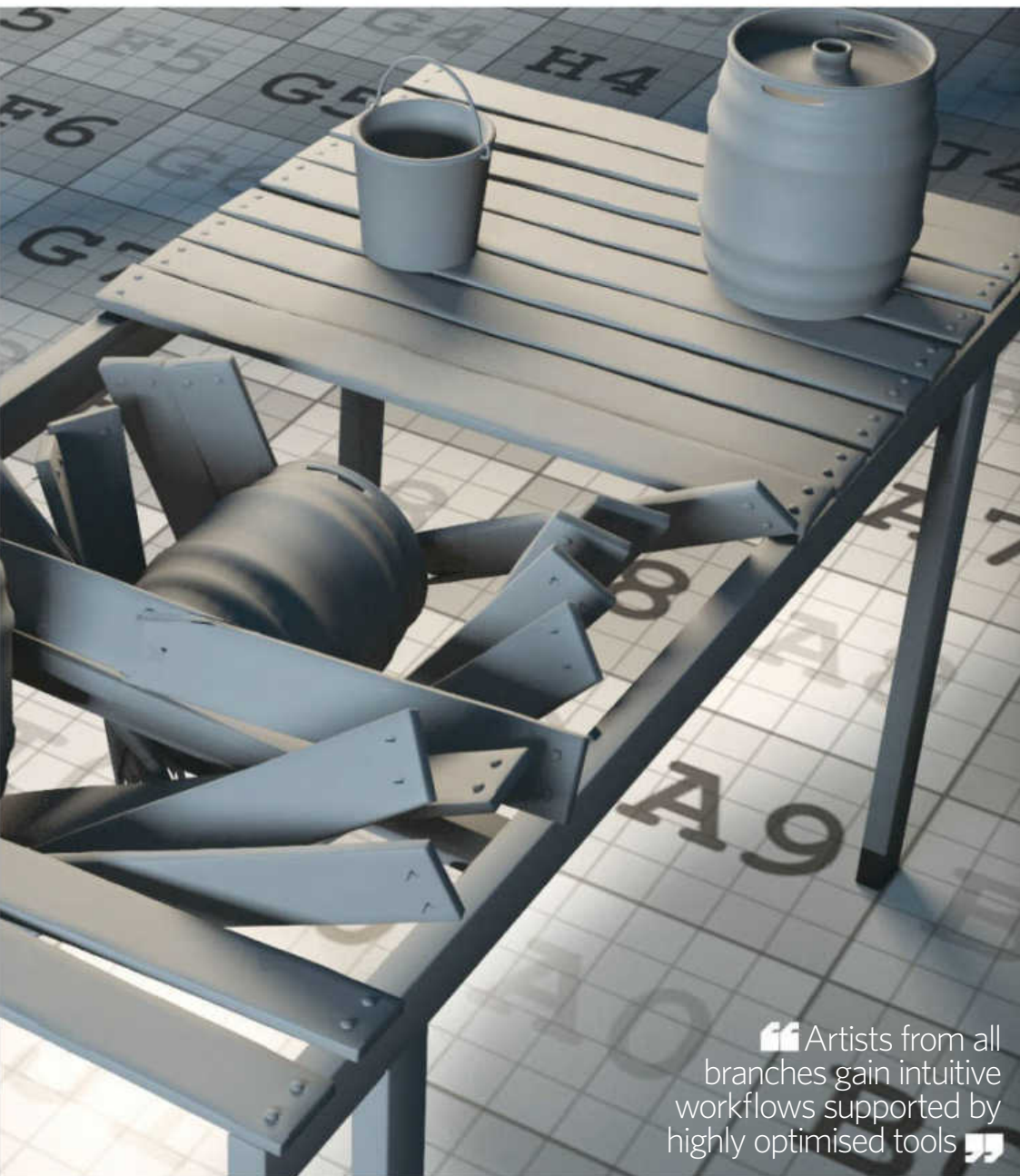
With version 16 you now get an artistic approach to creating realistic-looking fragments without dealing with complex node systems. In the SOP context, you can now take a node called Boolean SOP – simply make your wooden house out of planks, create as many cutting planes as you want and place them corresponding to the planks. The wooden house will be input one and input two of the Boolean node and can take any number of input objects as a slicing tool. Now, your pieces are in shape without plenty of nodes.

There are great improvements on the shading and VFX side as well. The shading workflow is optimised and now lies fully in VOPs, which means the SHOPs are legacy. Texture baking has had significant quality improvements and VOP materials can be directly assigned to objects. On the fluids side a suction fluid tool helps drive fluid sims towards a target object. Crown splash tools help with creating realistic raindrops on a fluid surface and the new ocean architecture allows unlimited tiling of ocean spectra as well as artefact-free warping of oceans. The seamless blending of ocean and fluid simulations is great.

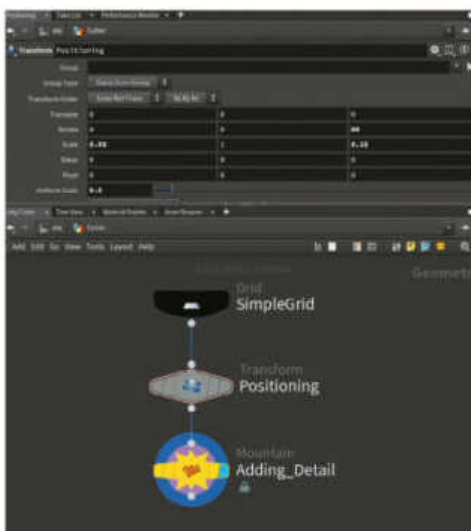
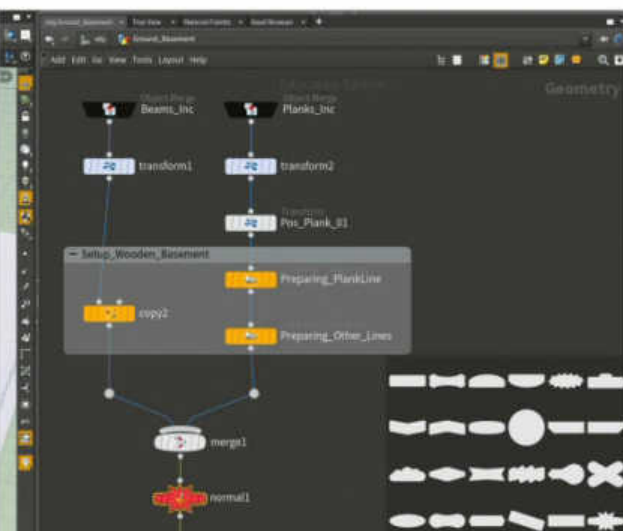
Animators, modellers and game artists alike will have a much easier time in Houdini 16. The list of improvements is large but one thing is clear: this is truly the biggest and most exciting Houdini release ever.

Rainer Duda





“Artists from all branches gain intuitive workflows supported by highly optimised tools”



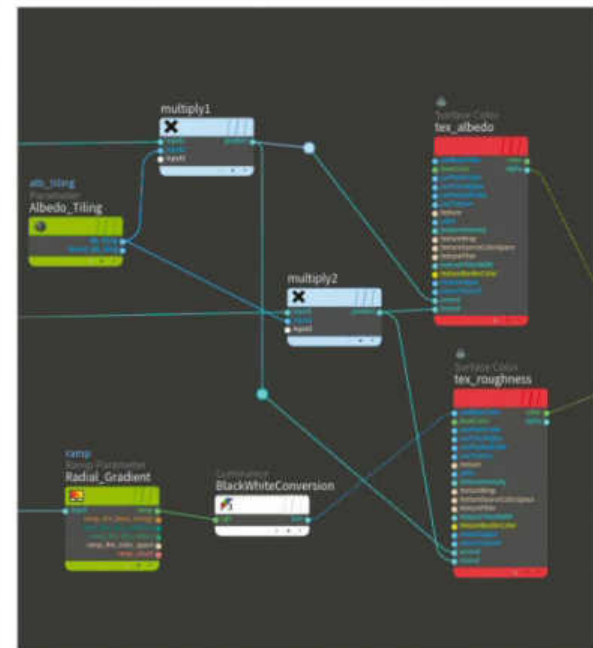
MAIN The advanced Boolean operations, including an arbitrary amount of cutting objects, offer an artistic destruction workflow

BOTTOM LEFT New users will have a much easier time with the revamped Node Network Editor and its enhanced navigation and organisation functionalities

BOTTOM MIDDLE Game artists get a much more advanced texture baking system in Houdini 16 for baking great maps

BELOW SideFX enhanced the shading workflow by bringing all shader work into VOPs. Additionally Disney's principled shader is now fully featured including an advanced SSS shader

BOTTOM RIGHT VFX artists can create better-looking water sims with less work because of the seamless blending of ocean and fluid simulations



Essential info

Price	\$4,495 (perpetual)
Website	www.sidefx.com
OS	64-bit, Windows 7 SP1 and up, OS X 10.10.2 and up, Linux)
CPU	Recent-generation 64-bit quad core CPU
RAM	16GB RAM
Graphics Card	GL 4.0+ GPU Card with a minimum of 4GB RAM
HDD	1GB free disk space for installation

Summary

★★★★★	Features
★★★★★	Performance
★★★★★	Design
★★★★★	Value for money

Verdict ★★★★★

With compact workflows next to intuitive viewport controls, Houdini 16 is a fantastic tool for artists

Substance Designer 6

The latest iteration of the material authoring tool introduces text and curves, but is it worth the upgrade cost?

Substance Designer 6 is the latest release from Allegorithmic in the Substance Suite. It boasts some powerful new nodes, new features and improved baking options.

Two of the newest nodes added to Designer are the curve and text nodes; these long-awaited additions offer greater potential to the already well-established set of tools. The text node enables you to create text within your graph in any Windows-installed font as well as imported text. Although creating text has its advantages across materials such as trim sheets, it can also be used in creative ways for extracting complex patterns and shapes. Shapes that are much harder to author in Substance such as neoclassical or baroque are much more accessible and applicable to the procedural approach.

The curve node is where the program really shines. Not only can you edit images using the curve node as you would have done in programs like Photoshop (simply double-clicking to add keys), you can now edit a curve profile as if 3D modelling it from a side profile. Using this approach and combining with simple shapes or even text enables you to create really complex and detailed height maps incredibly fast. This method retains the power of Substance's procedural infrastructure, which means anything is editable as you work. Being able to tweak along the chain of nodes is still as useful as ever.

As well as the new nodes, Designer 6 offers some powerful new baking options, support for 8K and non-square texture baking. Although the support for 8K tends to fall more in line with film production than games, the non-square texture approach is something used quite regularly for videogames. The addition of support for this type of baking is greatly welcomed.

Designer also brings support for scan processing. Scan data for mesh and textures is something that is becoming more and more popular, especially in triple-A games. The node

added enable you to take raw images from various lighting setups and generate usable texture maps. Its options include cropping to a usable texture ratio from imported images and clone patch, which enables you to clone various areas of the texture to patch any issues. Many of these nodes also support these functions over multiple textures at once, allowing for quicker processing.

Aside from these main features, you also have a handful of other usability improvements, including the ability to cancel baking, changing the overall size of your graph at the top of the graph window, and simplified gradient picker options.

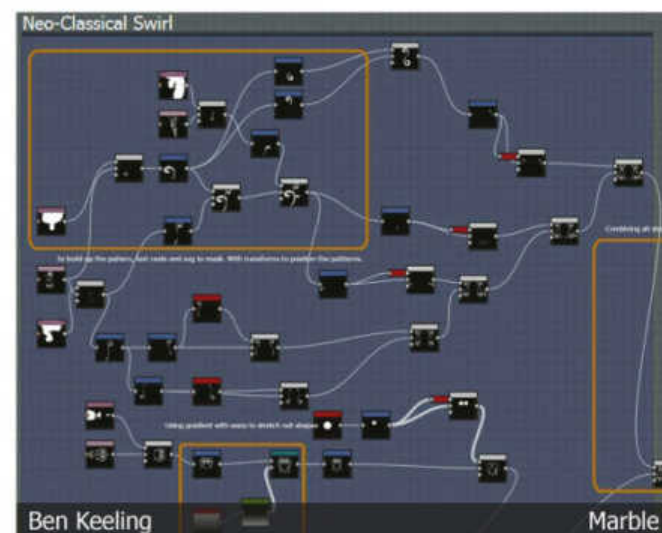
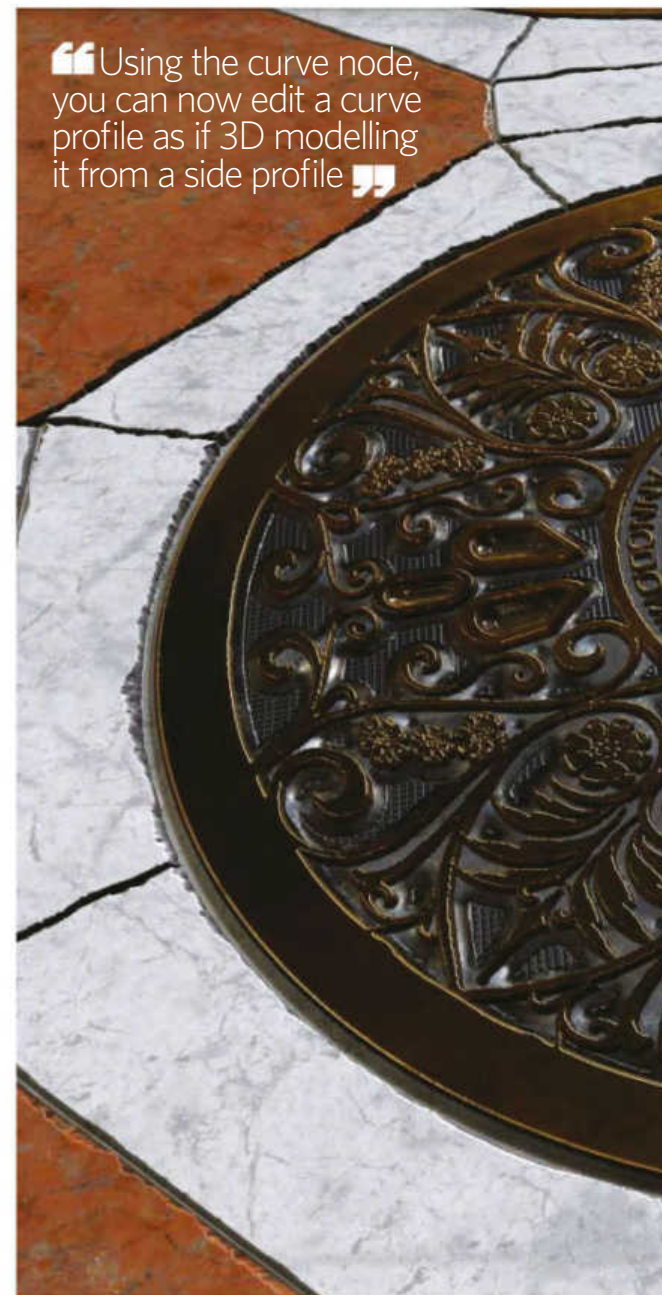
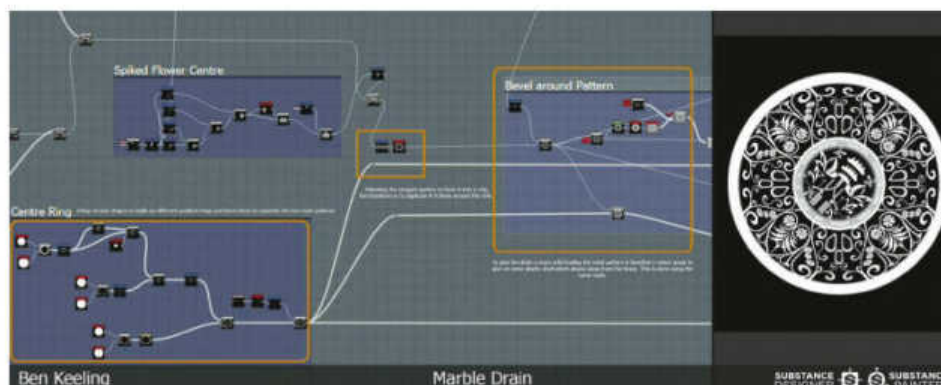
Substance Designer 6 remains a fairly stable program as well with few crashes and generally fast performance. It seems to have little impact on the CPU times. As before, the more complex the graph gets and the larger the size, the slower it tends to run.

Although upgrading to the new version will set you back \$75, you are also investing in the wealth of content that will likely be released under the 6 version number. With Substance Designer 5, you had access to a series of regular version drops, which improved upon and added to the toolset throughout its lifetime. This alone is worth the price tag of an upgrade, even without the new additions. Designer features also make their way over to the Painter as well, which improves the suite as a whole.

With Substance featuring so heavily in industry pipelines nowadays, it is a great time to invest. The software itself is well developed and Allegorithmic has done a good job of building a great support community, too. Tutorials are released for new software drops regularly and there is a good community of artists out there to help the inexperienced get up to speed.

With a wealth of new tools and updated features and the promise of more to come, now is the time to invest in Substance Designer.

Ben Keeling



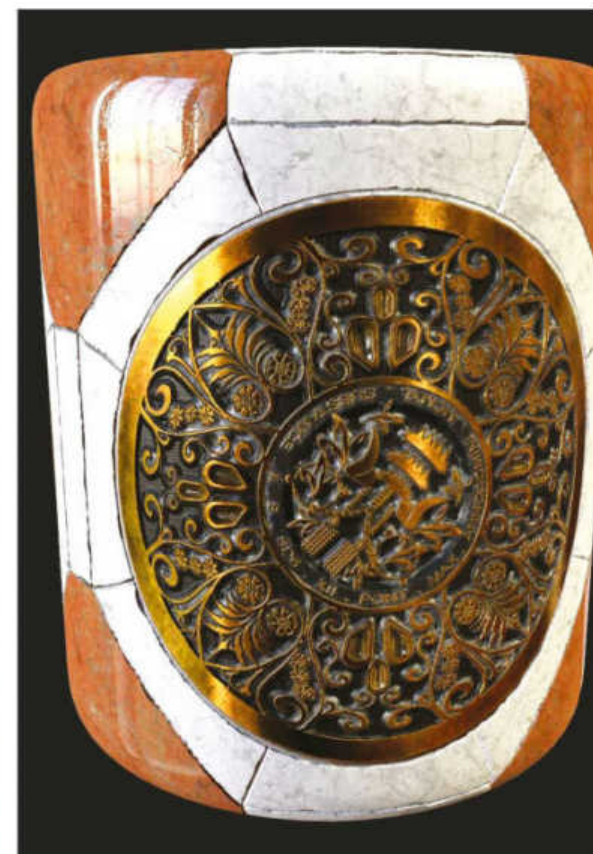


MAIN Close-up of the marble material as viewed from the floor

BOTTOM LEFT This is the process of combining the different elements and rings together; it shows how to get the shapes to line up. It also shows the process of getting a plastic material underneath the brass to bed the drain in more

BOTTOM MIDDLE This is the main process taken to blend the drain detail. The text node is used to make the majority of the shapes, with curves to tweak the profile

BELOW Render of material on a cylinder, which shows off the marble definition



Essential info

Price	\$149 Indie Licence
Website	www.allegorithmic.com
OS	Windows 7 and up, OS X 10.10 and up, CentOS 6.6 or Ubuntu 12.4
GPU	Integrated GPUs are not recommended
RAM	2GB minimum, 4GB recommended
DirectX	Version 10

Summary

★★★★★	Features
★★★★★	Performance
★★★★★	Design
★★★★★	Value for money

Verdict ★★★★★

Feature full and packed with new tools, Substance Designer 6 improves on an already great program

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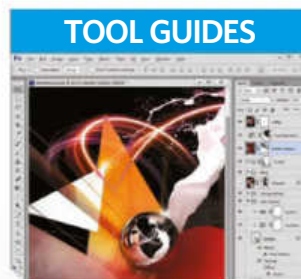
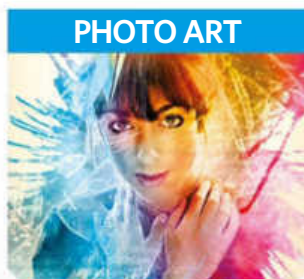
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VFX studios, expert opinions
and the 3D community



Dan & Max



Janet & John



Rhyley

“What we talk about on the podcast can and will affect the way our lives will be. It’s about all things in the computer graphics world.”

Christopher Nichols,
Chaos Group Labs



Rick and John



Gray & Steve

088 Community News

CG Garage celebrates 1 million downloads

Christopher Nichols of Chaos Group Labs reveals all about the hugely successful podcast

090 Industry News

Play and learn with Pluralsight

Re-create a playable game with Pluralsight and learn about the game engine from Silicon Studio

092 Project Focus

Ari Rubenstein

Blue Sky Studios' senior compositor tells us how hard work and enthusiasm led to two decades of working in the VFX industry

096 Social

Readers' Gallery

The latest images created by the 3dartistonline.com community



Engineering the CG Garage podcast

After celebrating an incredible 1 million downloads, director of Chaos Group Labs Christopher Nichols reveals his secret recipe for a successful podcast

With an astonishing 110 episodes live at the time of writing, CG Garage is perhaps the most prolific and recognised podcast for computer graphics in the entire world. In a little over two years, CG Garage achieved the million download milestone in February 2017. Its growth has been astronomical, with guests including Blur Studio founder Tim Miller, Oscar-winning director Brenda Chapman and legendary architect Art Gensler. The brains behind the popular show is Christopher Nichols, who hosts the podcast alongside being director at Chaos Group Labs.

Like many of his VFX contemporaries, Nichols started his career in architecture. He joined Chaos Group Labs after befriending Chaos Group founder Vlado Koylazov and CCO Lon Grohs. A bridge between Chaos Group customers and the R&D team, Nichols explains one of the influences behind the CG Garage podcast – listening to podcasts as he drove to work at Chaos Group Labs. “One of my favourites is Nerdist. Their style is fairly unique in that it’s conversational and freeform; they don’t edit the podcast either, which gives people the opportunity to be a fly on the wall of an interesting conversation.”

It was partly the influence of Nerdist that led the way to CG Garage. “I decided to do an experiment to see if I could replicate what Chris Hardwick was doing for the CG community. Over the years, I have been to plenty of lunches where I walk away thinking: ‘If only this conversation was recorded, people would eat it up.’ So we got some mics, a portable mixing board, and I started recording. It proved to be easy enough to do. I then started to go through my Rolodex and see who would be fun to talk to.”

And that was that, Nichols began speaking to guests in front of the mics and mixing board. There was no script per se, which was in part due to the Nerdist influence and in

part due to the nature of the show. “It is actually very organic,” says Nichols of how each episode is planned. “If I meet an interesting person, I tell them we should do a podcast together. Sometimes people are looking for a forum, so they ask to come on to talk about their careers. Other times I hear about a project I’m really interested in and approach a project lead. In general, I try to keep my podcast gear as portable as possible, so I can do shows wherever I go... Conferences like FMX and Trojan Horse

“The community wanted to hear these types of stories... this type of information can really benefit the industry – as long as it is made public”



Rhylor2



Ridley Brown



Steve Sade ZLT

was a Unicorn are great places to find interesting people. Great episodes always come out of those shows."

When he first started the podcast, Nichols never expected it to be so popular, let alone reach 1 million downloads. Now with over 20,000 listeners a week, and having met that awe-inspiring 1 million download mark, Nichols reflects on how the show got to be so popular. "I think the growth of CG Garage has been attributable to two things: the community wanted to hear these types of stories and have access to informed conversations about CG careers, techniques, trends and so on. This type of information can really benefit the industry - as long as it is made public. Many ideas that Chaos Group puts into practice actually come from conversations we have on the podcast. One of the fun things is to watch how fast the show has taken off. At this rate, I expect us to break 2 million downloads pretty soon."

Of the future, Nichols is excited to keep getting creative with CG Garage. "Honestly if I can keep doing this, I'd be happy. The podcast is what gets me excited about all the other things I do and my job. Plus it's energising to have great conversations with creative, innovative people."

"If there is any growth I want, it is to reach to a wider audience. What we talk about on the podcast can and will affect the way our lives will be. It is not just about the latest visual effects in movies. It's about all things in the computer graphics world. And, eventually, this will be a major part of our reality."

“It's energising to have great conversations with creative, innovative people”



VLADO



Steve Bradley, Pascal Bérard

“Many ideas that Chaos Group puts into practice actually come from conversations we have on the podcast”

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Fa



Swords And Shovels was created by Pluralsight in collaboration with games veterans

Pluralsight's game dev course "first of its kind"

New courses let you play a fully developed game and teach you how to re-create it with Maya, Unity and more

Technology learning platform Pluralsight has launched new courses as part of its Game Environment Modeling path.

Aspiring game developers can play the free, downloadable game *Swords And Shovels* and then learn how to build it over a series of courses teaching gaming environments, character modelling and gameplay elements.

The veterans behind *Swords And Shovels*

The free game was authored in collaboration with game artists and devs including Jean Simonet, Jonah Lobe, Dan Cox, Michael Baker and Alex Jerjomin, who are known for their work on *The Elder Scrolls V: Skyrim*, *Fallout 4*, *Fable Legends*, *Splinter Cell: Blacklist* and *Below*.

Swords And Shovels is a free dungeon-crawler that comes complete with a full story and combat mechanic that can be adapted on the course.

"As technology becomes more complex, the art of creating games will become increasingly interdisciplinary," said Andy Rahden, VP of creative, design and engineering at Pluralsight. "By embracing hands-on, interactive mediums like *Swords And Shovels* and the Game Environment Modeling learning path, we are helping game developers understand the full inner-workings of a game, see where every little piece fits and interacts within the pipeline and master the skills they need to be successful."

The game and accompanying courseware was designed and authored by Josh Kinney, curriculum manager at Pluralsight, with help from games industry veterans.

Swords And Shovels is available for immediate download at pluralsight.com/gamedev.

Redshift for Houdini unveiled

Lightning-fast rendering speeds now available for the SideFX tool

Houdini has finally received Redshift integration, bringing the biased GPU-accelerated renderer.

The Redshift for Houdini plugin supports hair and fur curve primitives, plus automatic and configurable tessellations of Houdini primitive surfaces. It also supports Houdini instancing, which includes the Instance OBJ node, arbitrary user data attributes per object or instance, enables shading variation without the need for different materials, the render of any Houdini primitive as RS strands, direct rendering of OpenVDB files and the Houdini Volume, and VDB primitives and non-GUI tools.

"Projects created in Houdini can range from the deceptively simple to incredibly complex. Having this new integration with Redshift will be a huge benefit to a whole range of Houdini users as Redshift produces super-fast renders, subsequently enabling shorter iterations," says Cristin Barghiel, CTO at SideFX of the Houdini and Redshift integration. "Having already seen some really fantastic work produced in Houdini and rendered with Redshift during the Alpha testing phase, it is our hope now that this official integration will work to empower even more Houdini users to create work in new and interesting ways."



Redshift for Houdini image by Shawn Wang

HAVE YOU HEARD? Environment tool World Machine has returned with its first update in over a year!

Xenko full game engine release date revealed

The open-source C# game engine will be released in April 2017

Silicon Studio, the Japanese game innovation company, has announced that its C# game engine Xenko will be available commercially from April 2017.

Xenko is the only commercial engine to support the latest C# and was shown off at the recent GDC 2017, with new features including high-end rendering, VR support and a scene streaming system as part of Silicon Studio's showcase.

Xenko is open source, fully multithreaded, VR ready with a full toolchain for asset creation (including scene editor, nested prefabs, a UI editor, sprite editor, curve editor and more) and has C# 6.0 scripting. There is also full support for Vulkan, physically based materials, alive shader and code recompilation and a flexible, customisable rendering pipeline.



Xenko can deploy to .NET platforms currently, with support for macOS and PlayStation 4 coming soon



DriverMaster 1.0 out now

New tool automatically creates a car rig for 3ds Max

DriverMaster is a tool that creates a four-wheeled car rig automatically, and users will be able to animate the motion for the vehicle manually or by using the curve in the scene. DriverMaster is \$50 but readers can use the code "3DARTIST20" to get 20 per cent off until 1 May 2018.

V-Ray 3.5 for Nuke released

Update means ray-traced volume simulations are now possible

Chaos Group announced V-Ray 3.5 for Nuke, a significant update that means Nuke artists will be able to make use of the V-Ray Volume Grid node for rendering and importing fire, smoke and other fluid simulations as OpenVDB files from applications like Houdini for the first time.

Compositors now get even more control over lighting and volumetric effects, and volumes rendered in V-Ray for Nuke are fully compatible with deep compositing. Deep data can also now be generated directly in Nuke, saving load time and disk space.

The V-Ray Denoiser is included in the update as well as the Light Cache GI, which speeds up renders with V-Ray's global illumination.

V-Ray for Nuke is a free upgrade for V-Ray 3.x for Nuke customers.



The Reorient Module will improve shaky handheld footage for experiences in VR

Software shorts



Plants Kit 1.0.23

Laubwerk's drag-and-drop plant model tool gets colourful deciduous trees from northeast America and east Asia added to its library for its tenth kit, with kits one to nine receiving updates. There's also Thea renderer support for SketchUp and a Plants Kit freebie for SketchUp, Maya, 3ds Max, Cinema 4D, Houdini and Python (Windows).



SUBD 2.0

The parametric subdivision extension for SketchUp has received a version two release. SUBD is now powered by Pixar's OpenSubdiv open source libraries. Mesh support has been improved, as has quad triangulation, multiple instances manipulation and much more. Image courtesy of 600v (600v.deviantart.com/).



PhotoScan 1.3

Agisoft's photogrammetry software now has added GPU acceleration for image matching, high dpi mode settings and an updated folder adding commands and more for Standard and Professional Editions. The latter also has additional multi-channel support, OPK angle support, a raster transform option, support for DEM generation and more.

DID YOU KNOW? Cinesite will be making its own animated features in-house based on comedy legend, Harold Lloyd



Job title Lead compositor,
Blue Sky Studios

Location Greenwich, CT

Website www.curvstudios.com

Biography Ari Rubenstein is from Maryland. From an early age he was inspired by comic book art and kung fu movies from the Chinese film production company, The Shaw Brothers. He has worked at Xaos and Tippet Studio and started his own company Curv, before joining Blue Sky Studios

Portfolio highlights

- *Ice Age: Collision Course*, 2016
- *Epic*, 2013
- *Rio*, 2011
- *Horton Hears A Who*, 2008
- *Charlotte's Web*, 2006
- *Constantine*, 2005
- *Starship Troopers 2*, 2004
- *Hellboy*, 2004
- *The Matrix Revolutions*, 2003
- *Alter Echo*, 2003
- *Africa's Elephant Kingdom*, 1998

Ari Rubenstein

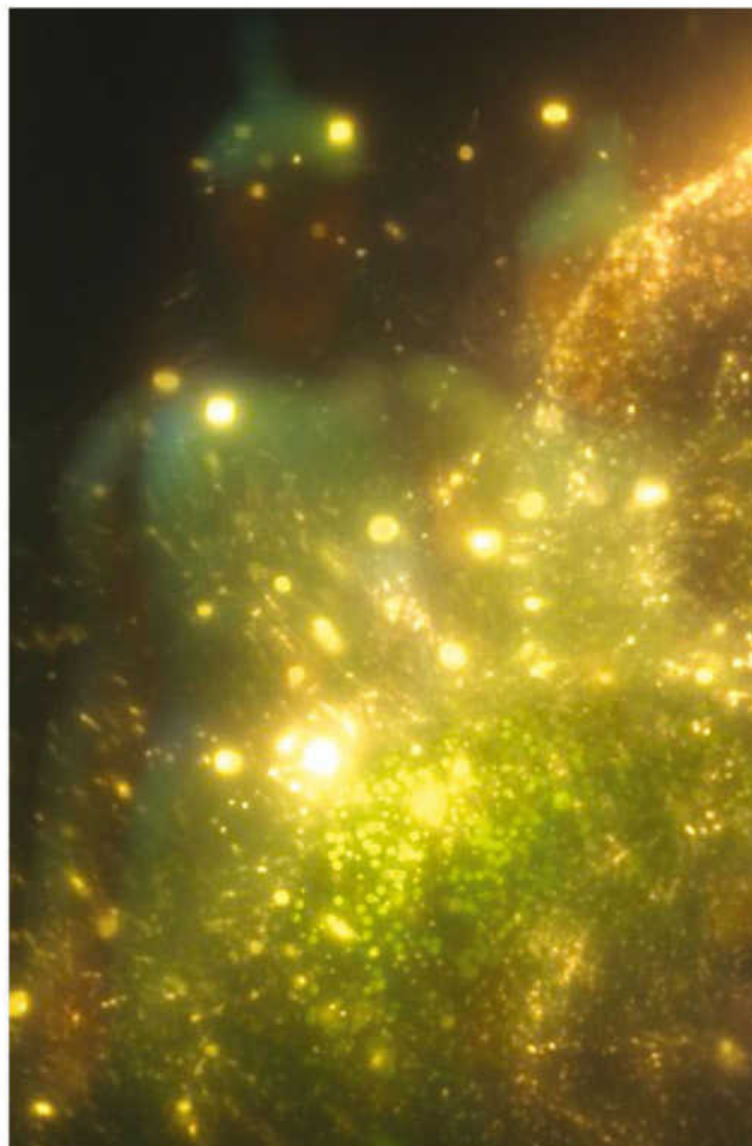
From Soundgarden to The Matrix and Ice Age, the industry veteran reveals his journey into filmmaking

It's the Nineties and Ari Rubenstein had just returned from a long exploratory jaunt across US, driven by what author Hunter S Thompson referred to as "a savage journey into the heart of the American dream". Unfortunately the "dream" ended like many others have done, unromantically through a variety of menial jobs, not least of which included a stint in Seattle setting up mics for a Soundgarden music video in the beginning of the grunge scene.

Rubenstein had gone home to Maryland and his father who, unimpressed with his then-directionless existence, gave him an ultimatum: he could stay the night but he must pick a trade by the following night or he would have to find somewhere else to sleep. Rubenstein went to the library, reading through a tome that was called *The Trade Book* in an attempt to become inspired for a new career path – but to no avail. He returned home, without an answer for his father. That's when he spotted a brochure detailing new computer animation program at the local community college. "I thought quickly to myself... I can draw really well, and the computer may cut out half the labour, I'll try it," Rubenstein tells us, "so my entry into this field was based on a lazy, last-minute desperate notion."

This last-minute choice would lead to Rubenstein being hired at a design shop in Florida, where his boss took him to SIGGRAPH, a still growing conference at the time. "SIGGRAPH's job board in 1992 had two standing boards with Post-it notes, a far cry from today. But it was enough – I didn't get a job with my boss looking over my shoulder, but I saw the birth of an industry I could explore."

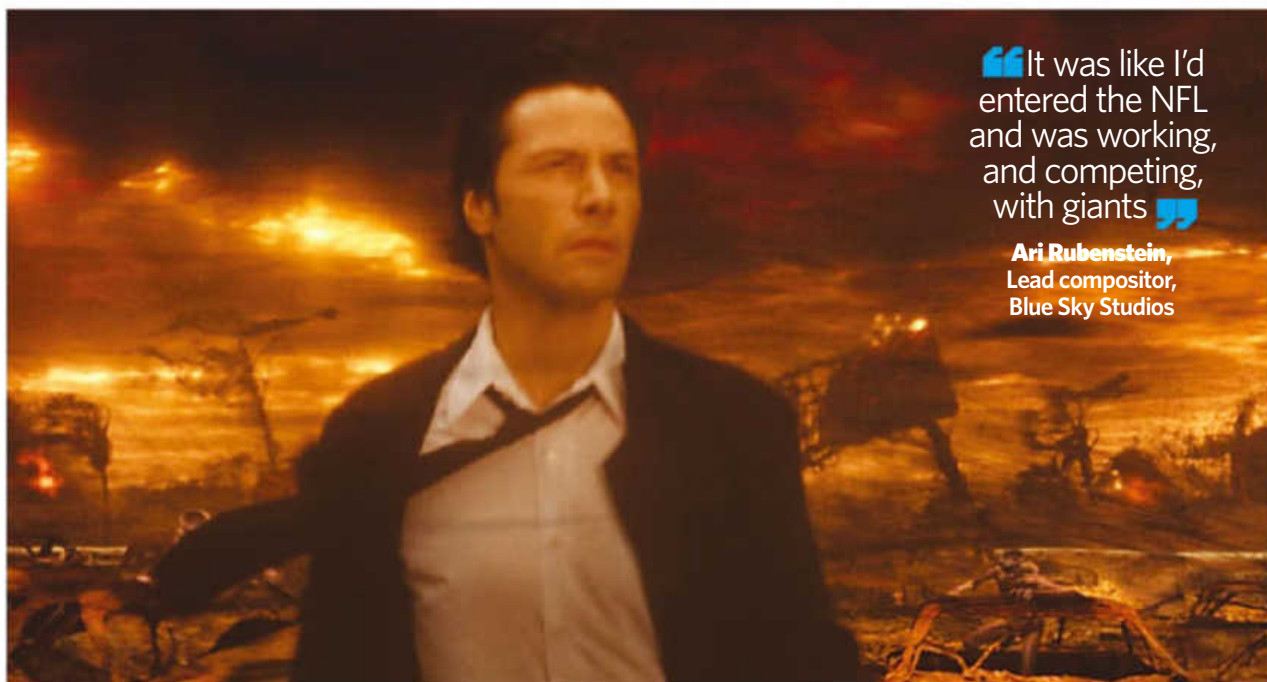
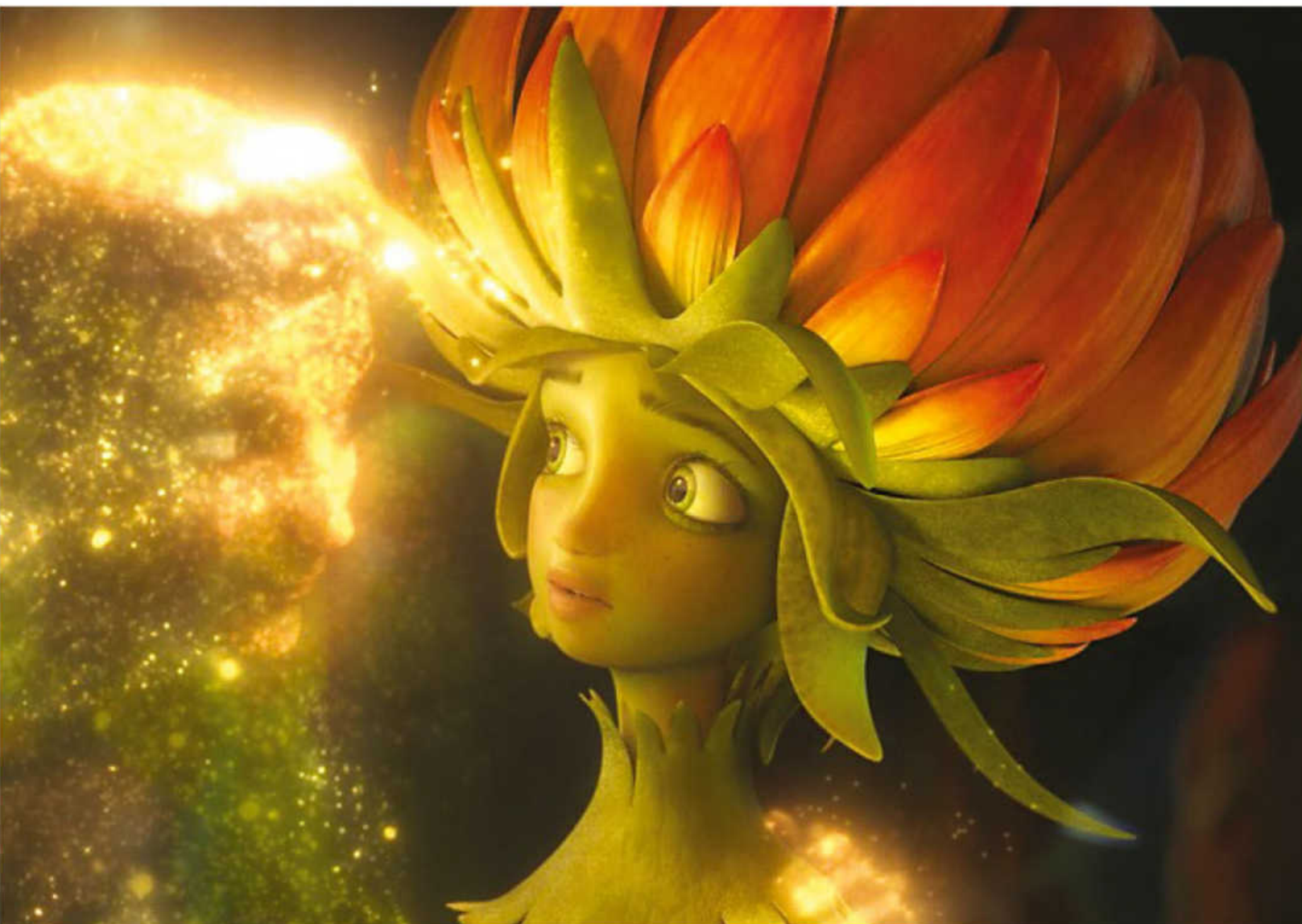
What followed was a two-decade career in visual effects across feature films, IMAX, TV and games, predominantly as



GIVE A LITTLE RESPECT

Ari Rubenstein offers some valuable advice for new and aspiring artists looking to join the industry

"Unlike 25 years ago, simple searches in Google and YouTube yield a vast array of information one can learn and grow from," says Rubenstein. "More than anything, though, give yourself a history lesson so you can come to appreciate those who came before you, whose shoulders you're now standing on, and from this perspective you'll inherently show respect and become one whom others are happy to collaborate with. Show humility through honest reflections and a thoughtful frame of reference. That said, I'm certain I have more humble pie to eat in the future."



“It was like I’d entered the NFL and was working, and competing, with giants”

Ari Rubenstein,
Lead compositor,
Blue Sky Studios





“It felt like a renaissance in computer graphics and filmmaking, partly because three trilogies were being produced globally (*The Matrix*, *Lord Of The Rings* and the *Star Wars* prequels) and artists and techniques were cross-pollinating like wildfire.”

Ari Rubenstein,
Lead compositor,
Blue Sky Studios



a compositor at companies including Xaos and Tippett Studio. “Specifically I enjoy control of the final image quality,” he explains of the drive behind his compositing work. “More psychologically I’m a big picture thinker, and compositing, being at the end of the production pipeline, is where all the disparate elements of artwork come together... I enjoy being in this driver’s seat and taking the film across the finish line.”

Rubenstein joined Tippett to work on *The Matrix Revolutions*. “It felt like a renaissance in computer graphics and filmmaking, partly because three trilogies were being produced globally (*The Matrix*, *Lord Of The Rings* and the *Star Wars* prequels) and artists and techniques were cross-pollinating like wildfire. There seemed great humility in the artists of that day, as everyone was being inspired and rewarded in such a way the ego seemed to fall away. I’ll admit I was a bit wide-eyed and bushy-tailed at that point but it was like I’d entered the NFL and was working, and competing, with giants. One day my VFX supervisor Craig Hayes (whom I’d read about in *Cinefex* for his work on *Jurassic Park* while I was a wee lad in Maryland) would be taking the time to ride a bike with me down to the ‘stage’ to show me the subtle aesthetics of how smoke appears in light rays across a full-size Stan Winston puppet, and the next day the *Matrix* directors [the Wachowski siblings] would be at my desk giving notes on the sickest shot I’d ever dreamed I’d have the opportunity to work on. It was nuts. Tippett was my big break as it were. It was a time where everything was still not possible, and so you were creating the industry and expanding it, whereas now it feels there are few new horizons to identify.”

His work at Tippett overlapped the creation of his own company Curv, where Rubenstein was responsible for sales, marketing, producing, VFX supervision and all other areas of the pipeline. Curv would produce 3D animation and 2D compositing for game cinematics, TV documentaries and feature films. After that, Rubenstein went to Blue Sky where he worked on films including both the *Ice Age* and *Rio* series.

In terms of enhancing his own artistry after 20 years in the industry, Rubenstein says that development is more than just being involved in your job. “From a career perspective I’m always looking for ways to create opportunities so I don’t get rutted, physically or financially. This translates into personal and commercial projects outside of my day job, but ones which fit a few criteria always, those being that it is something I find creatively and intellectually substantial, that I learn new and valuable techniques and that it in some way holds the potential to further my career. I think it is these side projects, more so than my day jobs, which have contributed to my development as an artist.”

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 Feel the Heat by Rico Cilliers 3DA username RicoC

Rico Cilliers says: "This character was done for a tutorial series I'm working on. I sculpted it in ZBrush and did texturing, hair and lighting in Blender. I did some post-processing work in Krita."
We say: There's something very Disney-esque about Rico's wonderful character render, particularly in the facial proportions. It's nice to see a cartoon-style render that still flirts with realistic details, seen here in the groom work and facial pores.



02 Hocus, Pocus, Focus! by Marian Vladut Enculescu 3DA username www.vladut.me

Marian Vladut Enculescu says: "I have this habit to play with words. Sometimes they just sound good. In this case they felt like a general truth... that there is no magic trick to get things done."
We say: It's true - there isn't a magic trick that conjures up great work. Not only is Marian's render accomplished, but it also carries a strong message for creatives.



03 Twist Tower by Ivan Banovac 3DA username IvanBanovac

Ivan Banovac says: "When I started this project, my first intention was to design a modern building with a cinematic feel. I used lots of references from other buildings like The Shard and Cayan Tower and merged them into my own design. It took two days to model everything in 3ds Max and render in V-Ray."
We say: Experimental arch vis that plays with perspective is always interesting to look at, and Ivan has created a really stunning render with this in mind.



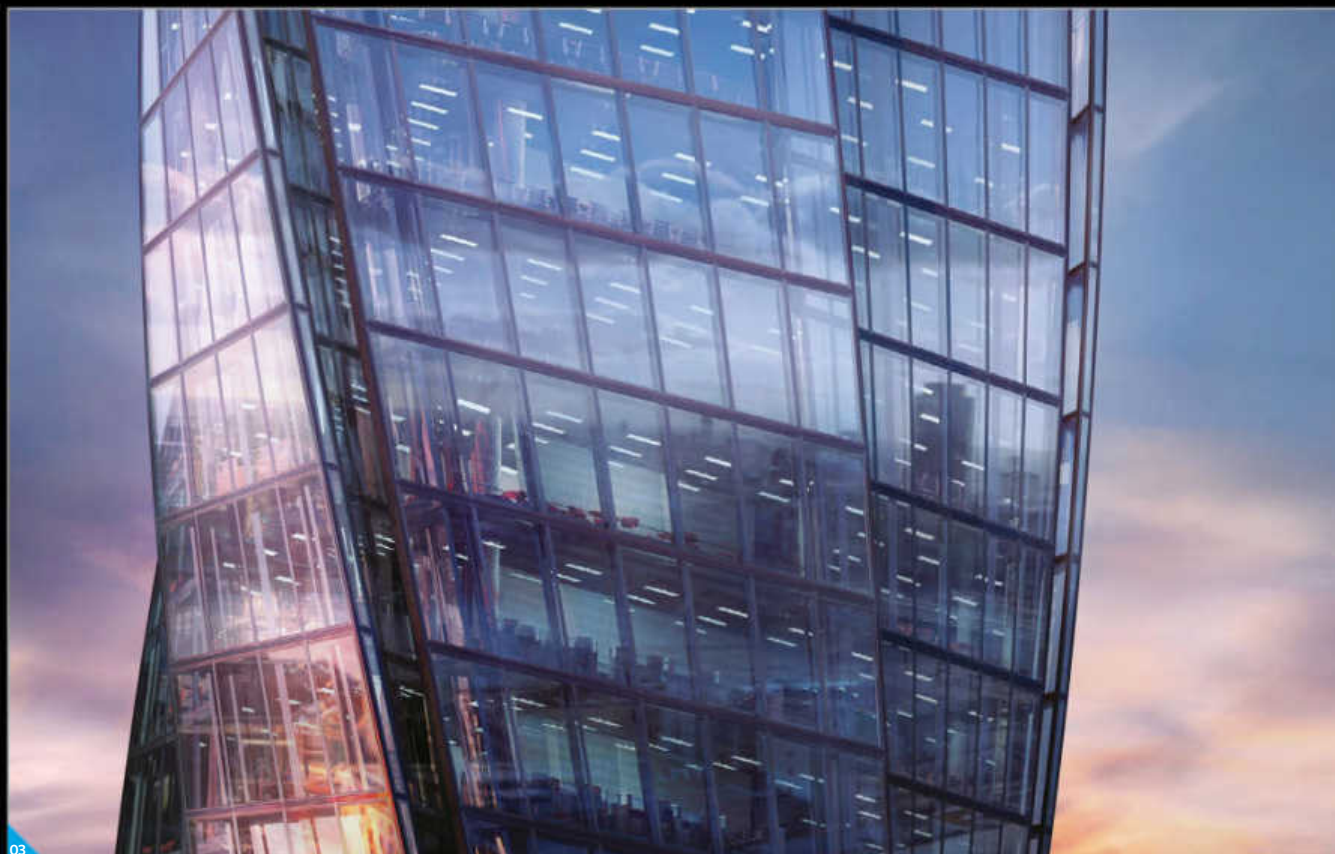
04 Decorative Bottles by Milos Eric 3DA username ericmilos

Milos Eric says: "I'm the founder of DSE Visualisation studio. My passion is to create photorealistic visualisations, and this is one of my first with the FStorm GPU render engine. The advantage of this is that you can think and handle the scene as a photographer."
We say: This is a really well presented render and the choice of colours works really well. The depth of field adds another level of sheen.

Image of the month



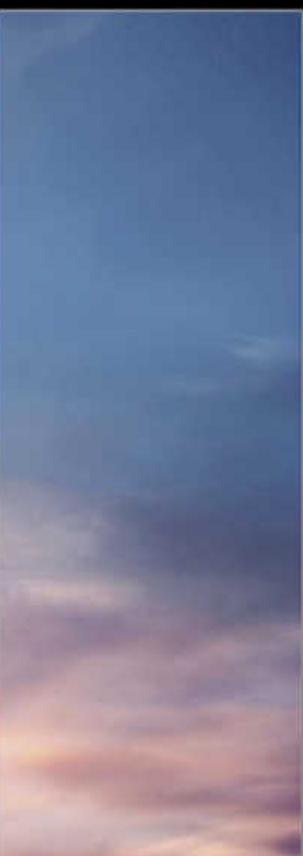
01



03



02



04



Earth (Night) by Hamid Reza Nahavandi
3DA username **NHRA**

Hamid Reza Nahavandi says: "I got the idea for this render from a photo that I saw, so I tried to simulate it. I wanted to test V-RayDisplacementMod in V-Ray, with default settings and progressive rendering. The render took two minutes to complete."

We say: This is a really interesting abstract piece from Hamid that appears as artistic as it does technical. The bulbs themselves and the texture of the earth beneath them are both well realised and pleasing to the eye.



Keeper of the Flame by Momo Puegerl
3DA username **Momogojira**

Momo Puegerl says: "I love monsters, so I try to create my own whenever I find the time for it. This dragon was sculpted and rendered in ZBrush, then composited in Photoshop."

We say: We love monsters too, and Momo's beast stood out thanks to the intricacies in the sculpt itself and the really interesting choice of colours. We'd love to see this bust expanded on to explore bodily forms.

Technique focus

Incredible 3D artists take us behind their artwork

TEXTURING For the head I used TexturingXYZ Displacement maps with the secondary and tertiary details using UDIMs in Mari to preserve all pore details, and added some micro details with Bump maps. I textured the head with 360-degree cross-polarised images and clothing was textured in Substance Painter, where I added dirt, scratches and dust.



Luis Yrizarry Labadia
artstation.com/artist/blifrok

Luis is based in Madrid with 13 years of experience in advertising as a 3D artist and art director

Software 3ds Max, ZBrush, Mari, Substance Painter, Ormatix, V-Ray

John the Loyalist,

2017



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