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# ANiMATiON

FEATURES + WORKSHOPS + INTERVIEWS

ARTIST

NO.1 FOR DIGITAL ARTISTS  
**ImagineFX**  
PRESENTS



**DISNEY'S**  
**12 RULES OF**  
**ANIMATION**

**PLUS!**  
**KUBO AND**  
**THE TWO**  
**STRINGS**

How Laika created an  
animated masterpiece

**HOW TO...**

CREATE 3D FUR & FUZZ  
MASTER STORYBOARDS  
CONCEPT CHARACTERS  
DESIGN SCENERY

**Digital**  
Edition



SIXTH  
EDITION







# ANiMATiON ARTIST

Welcome to the latest edition of Animation Artist. Celebrating the art of animation, discover insights and techniques from professional artists, and see what it takes to work and create in the animation industry today. Discover how Disney's blockbuster Moana was created, read interviews and tips from the experts, and learn the techniques needed to create animation art – including workshops on designing characters, creating fur in 3D software, and how to apply Disney's 12 principles of animation to your own work. In addition to this, there are also free resources available on FileSilo, including project files, video tutorials, brushes and much more. Turn to page 144 for more on how to access your free resources.



「 FUTURE 」



# ANiMATiON

## ARTIST

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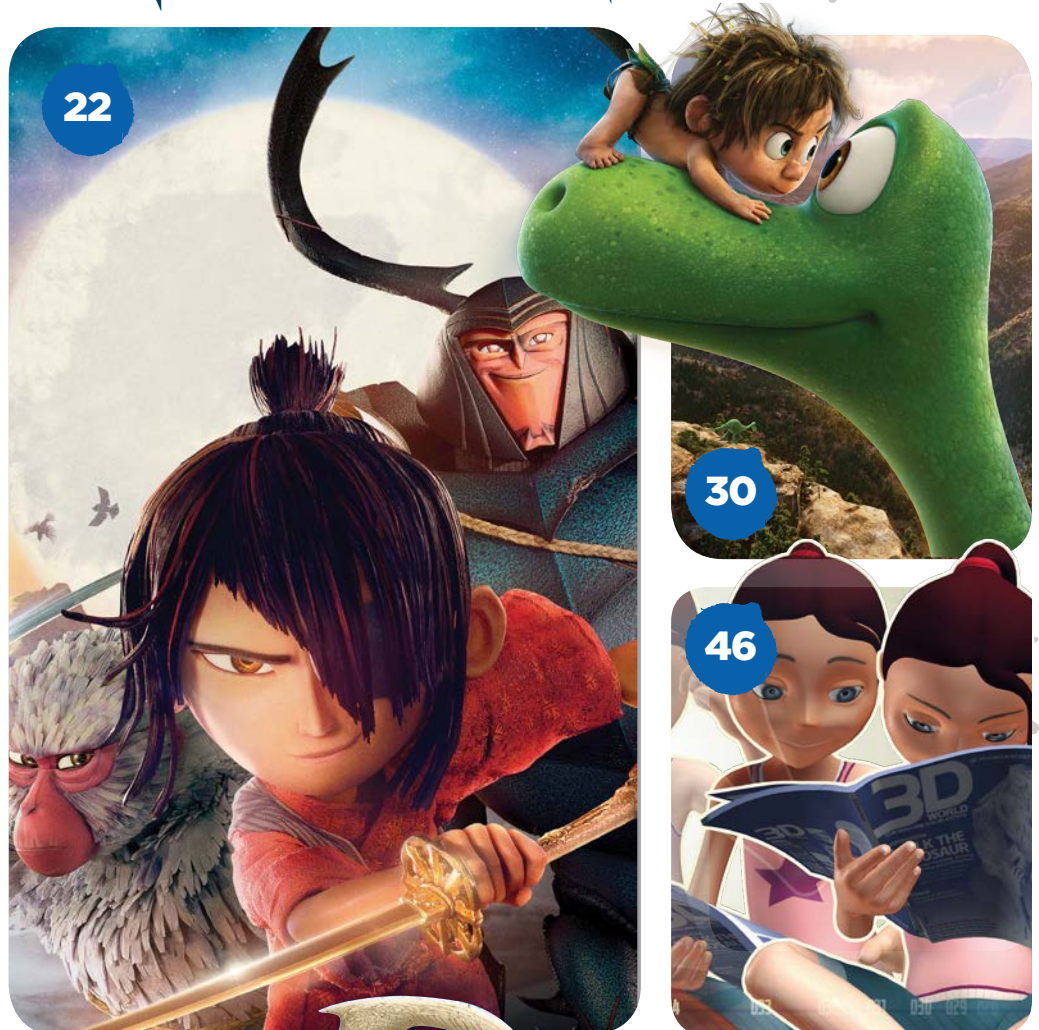
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## Artist Portfolio

# PASCAL CAMPION

**Gary Evans** maps out the successes – and setbacks – in the French illustrator's globe-trotting career

**A**fter failing to get into his first-choice art school, Pascal Campion took a job as a dishwasher in Strasbourg. It was Christmas, dishes piled up all around him, and he'd recently lost half a tooth after being jumped by muggers outside the restaurant. The Frenchman remembers thinking: "Man, I'm so going to enjoy being an artist."

Pascal knows how to roll with the punches. He got into the art school

the following year. In fact, many of the animator's greatest achievements have followed major setbacks. The first of these came when he was very young. He still thinks about the incident to this day.

Pascal was born in River Edge, New Jersey. When he was three years old, his parents separated and he moved from America to France. His mother is French. He describes his childhood in Provence as "pretty idyllic" and remembers being surrounded by the "sunny, beautiful, vibrant colours" that now characterise his work.

His family owned all the Tintin and Asterix stories. Older brother Sean was into Marvel comics and would let Pascal read them, but only after getting him to copy the covers. Pascal says Sean is the main reason he's an artist. ➔

### Artist PROFILE

**Pascal Campion**

**LOCATION:** US

**FAVOURITE ARTISTS:** Andrew Wyeth, Bill Watterson, Leo Espinosa, Tatsuro Kiuchi, Carl Larsson, Frederic Remington, Al Parker, Jon Romita Jr

**SOFTWARE USED:** Photoshop, Flash  
**WEB:** [www.pascalcampion.com](http://www.pascalcampion.com)



#### CHILLS

"I was playing around with buildings in this one – how to suggest buildings without showing buildings. Buildings feature a lot in my work."



#### WHEN THE SNOW FALLS

"I love doing facades; I love people watching. I do a lot of these types of images and I'm always trying to figure out what other people's lives are like."





**IT WAS 1980 SOMETHING,  
THE SUMMER WHEN**

*"I was feeling low because of work, so  
I did this piece that reminded me of  
the summers I spent in Alaska."*

“All I had to do was press Enter and  
the computer would play back all  
the frames I had just drawn”



# INTERVIEW

## WATER GAMES

"At the beginning of my Sketch of the Day series, there was a period when I was drawing animals doing funny things. I still like doing some for my kids now and again."



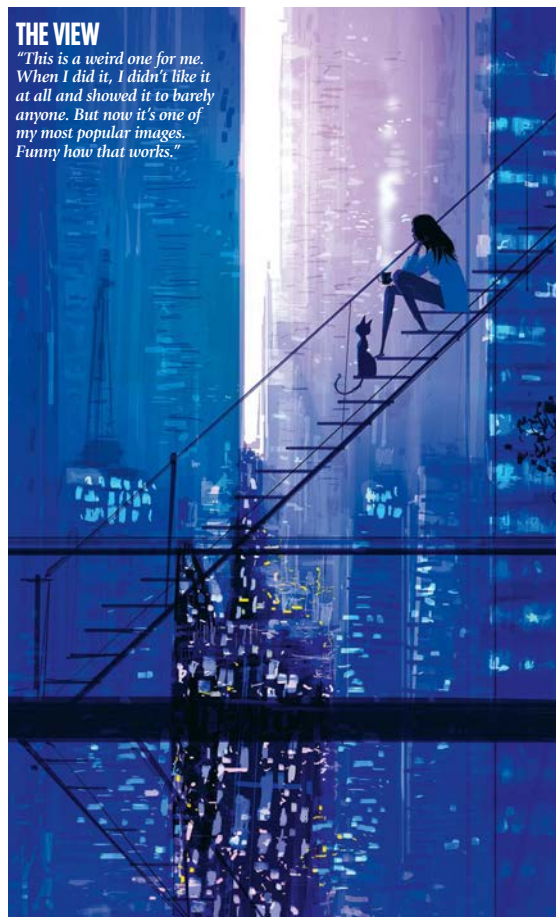
➤➤ Yet not everyone was so supportive. When he was 10, Pascal told an art teacher he wanted to be an artist when he grew up. He showed him work. "In a very serious tone," the Frenchman says, "the teacher said I should probably not consider this, because I just didn't have it. Up until that point, I really liked that teacher. That crushed me."

## UNUSUAL METHODS

Pascal studied at the Arts Décoratifs de Strasbourg. To get in, he sent a portfolio, then travelled to the school for a week of tests. He picked narrative illustration as his major. But before that, the teachers – unusual in their methods – worked out what students liked to do

## THE VIEW

"This is a weird one for me. When I did it, I didn't like it at all and showed it to barely anyone. But now it's one of my most popular images. Funny how that works."



“The teacher said I should probably consider not being an artist, because I just didn't have it. That crushed me”



best and made sure they did the exact opposite: everything from engraving to metalwork. In his final year, Pascal created three projects. Two of them had to be paid jobs, otherwise he couldn't graduate.

"They didn't tell us how to do things at all," Pascal says. "We had to come up with that on our own, which was very frustrating at first. That said, the big thing we did focus on was on how to tell stories, how to control what you're saying with your images, and how to make sure the audience understands what you want them to understand."

Before graduating, in 2000 Pascal spent a year as an exchange student at the School of the Museum of Fine Arts



# PASCAL CAMPION

## MEET ME AT FIVE?

*"This image was originally created for a workshop for ImagineFX! But afterwards I did this version, which is slightly different."*



in Boston. He also worked at Tom Snyder Productions. It was his first job as an animator.

Pascal flew to Kansas City to live with his brother. He wanted to work in the comics industry. But his career plans changed after Sean built him his first computer. Pascal began playing around with software called Macromedia Flash.

"All I had to do was press Enter and the computer would play back all the frames I had just drawn," Pascal says. "I fell in love with it because I could make animations instantly."

### LIFE ON THE UP – AND DOWN

He posted these animations online and job offers soon followed. He worked ➡➡

### THE GOOD KIND OF HEAVY

*"Every day in the afternoon we'd go with the kids to the park next to our house. They were still small enough that I could balance them all on the see-saw. I loved those days."*





# INTERVIEW

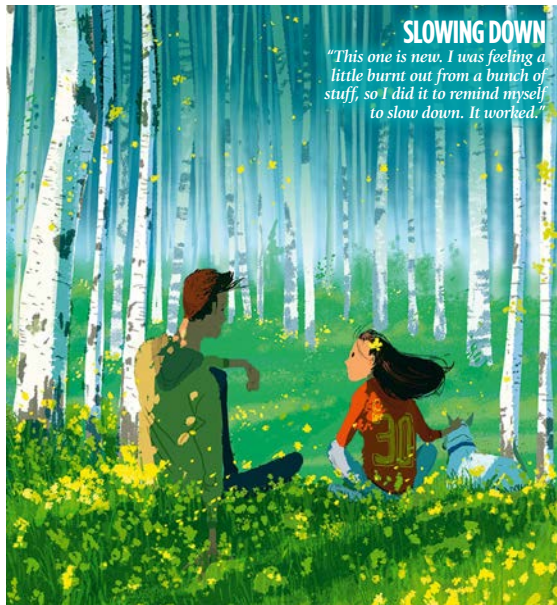
## FLUID

*"This is a summer image. I was just happy that day. I remember doing it and just singing to myself the whole time."*



“I start with a colour and work with it. Sometimes I draw a character or an environment and see what happens”





## SLOWING DOWN

*"This one is new. I was feeling a little burnt out from a bunch of stuff, so I did it to remind myself to slow down. It worked."*

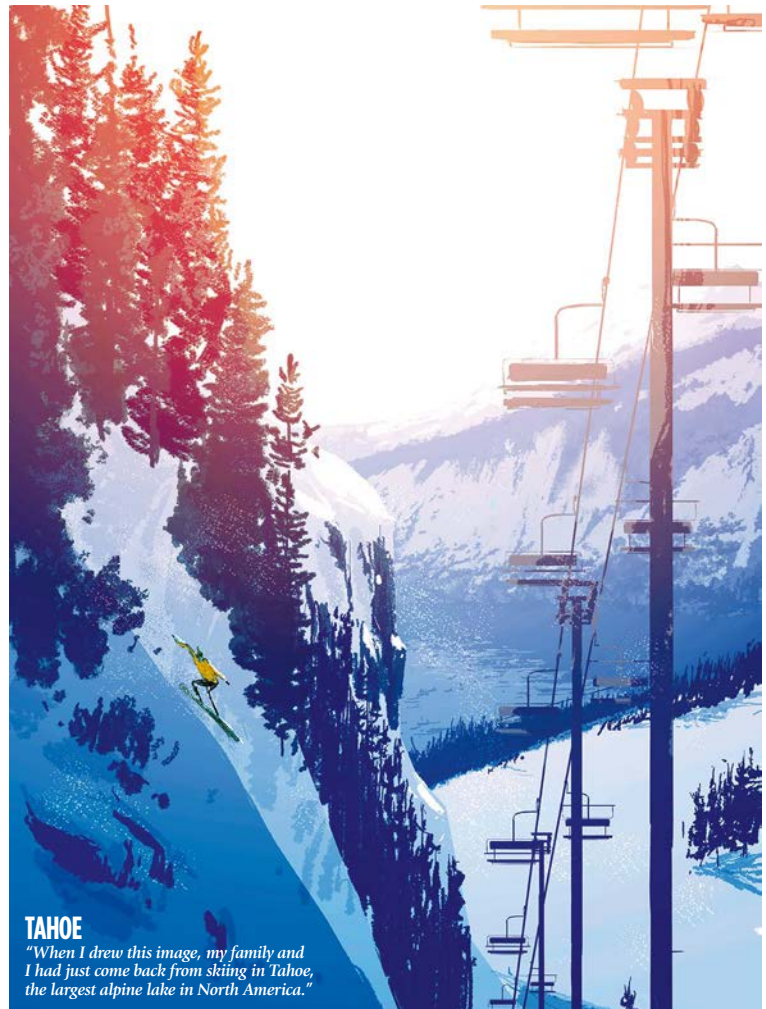
## YOU DON'T NEED TO BE THE BEST

Pascal explains how having children changed his outlook on a career in art

After having kids I found that, because I was more focused, I could do more work in fewer hours. Being busy doesn't necessarily mean I'm being productive. This was a good thing for me to learn and accept.

I had to accept it because life changes all the time. My work will change with it, and that's okay. I say this because sometimes the conditions are ideal and I do a great piece, and sometimes I'm sick or my kids or sick, and my focus is split and my computer is slow and my dog needs to go out ... So my work will be what it will be. I had to learn how to live with this and accept it, which was not the case before I had kids.

I also chose to accept not being the best, instead of being the best I could be, which is very different. Before having kids, I wanted to be the best, no matter what discipline, and that made me work more and not take care about anything outside of work. When we had our first daughter, I realised I wanted to spend some time with her. She had a schedule. I had to get on that schedule if I wanted to be a part of her life. I did. And, oddly enough, my work completely changed and I loved that change. I felt a little stupid for not slowing down earlier. I enjoyed what I was doing more, because I wasn't doing it all the time.



## TAHOE

*"When I drew this image, my family and I had just come back from skiing in Tahoe, the largest alpine lake in North America."*

➔ at studios in San Francisco (where he worked on a web show), in Portland (where he became a storyboard artist), in Honolulu (where he met his future wife), and in Portland again (where he became a director). He put so much into his work, his personal life suffered.

"I was realising how empty my life was. I had nothing going on outside of work and had a hard time making and maintaining contact with anybody. I had broken up with my girlfriend a while back. I was very sad about that."

Pascal moved back to San Francisco to be with his girlfriend. He accepted a position at a company called Leapfrog as a lead animator, but he spent most of his time managing others. So he decided to come into work a little earlier each morning and draw. The Frenchman now has over 4,000 of these daily drawings.

"I start with a colour," he says, "and work with it. Sometimes I draw a character or an environment and see

what happens. In almost all cases, though, I have an idea of the emotion."

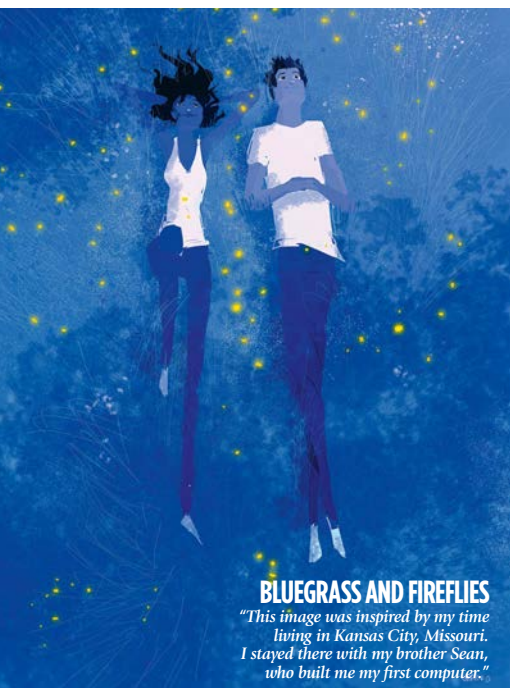
His Sketch of the Day series led to some big freelance jobs. DreamWorks asked Pascal to do development work on a feature film. "I actually got fired, because when we got to production work – that's the part where you stop doing conceptual work and you have to start rendering the elements as they will appear in the movie – they realised I didn't know how to do that."

## A SECOND CHANCE

DreamWorks put Pascal on another movie, Mr. Peabody & Sherman. He's also worked on projects for Disney, Paramount, the Cartoon Network, and many more. He creates covers for books and comics, does editorial illustrations, and works on video games and commercials.

Pascal describes working in these various fields as similar to speaking different languages. They each





➤➤ require a different part of his brain. “In animation I don’t care too much about the quality of the drawing, because all I’m doing is matching it to the approved design, which is usually a simplified design.

“I can’t listen to music or talk to anybody, because my whole brain is focused on getting everything to work together. I’m also moving pretty fast because I try to keep a spontaneity of motion – a flow and rhythm.”

## SETTING THE MOOD

Pascal describes his style as “loose and pretty utilitarian.” He wants the audience to understand in a split second exactly what’s happening in the image. So he makes each visual element as clear as possible. The same goes for the overall message – the audience shouldn’t have to work anything out. He uses light to set the mood, something that’s becoming an increasingly important part of his work. And he edits ruthlessly. No matter how good it looks, if it gets in the way of readability, of clearness, ➤➤

“I try to keep a spontaneity of motion – a flow and rhythm”

## ‘THE BLANK PAGE SCARES ME’

Pascal explains how he created a striking image of a couple in love...



### 1 A textured start

I add a little bit of texture, just so I don’t have to draw on a blank page. Whether it’s on canvas or on a digital screen, the blank page scares me. I do a loose pencil sketch of where the windows will go. Next, I establish my zones of contrast: dark inside and bright outside. This is more for me to know which type of values I’ll be using in different areas of the image.



### 2 The happy couple

I start adding details to the façade, and I block in my couple very loosely. My pencil sketches aren’t very good – at least, they aren’t clean. I know what I want, but because I don’t use lines in the final I don’t bother cleaning them up. In addition, if they’re loose it enables me to be more creative when I paint them. I make the figures dark to suggest intimacy.



### 3 Supporting cast

I add all the other figures. They are there to support the main characters, so I freehand them. Most of my images are like that: there’s one set of characters I’ve really thought about and everybody else is just freehanded. It makes it fun for me to draw.



### 4 Introduce some greenery

I add the tree to create a little bit of depth and make sure the leaves don’t cover any characters and that they’re not too close to the characters, to ensure the painting is readable.

### 5 A dramatic swathe of light (right)

This a late-afternoon image, so I made a big swash of light across the building. I prefer early daytime, late evening, or night-time, because the colours are more dramatic.







# INTERVIEW

“I’m trying to get the emotion to be the story, without making an abstract or gratuitous painting”



## MY RAINY DAY FRIENDS

“Growing up in Provence, I remember mostly sunny, beautiful vibrant colours everywhere. But I just like ducks, rain and moody weather.”



# PASCAL CAMPION



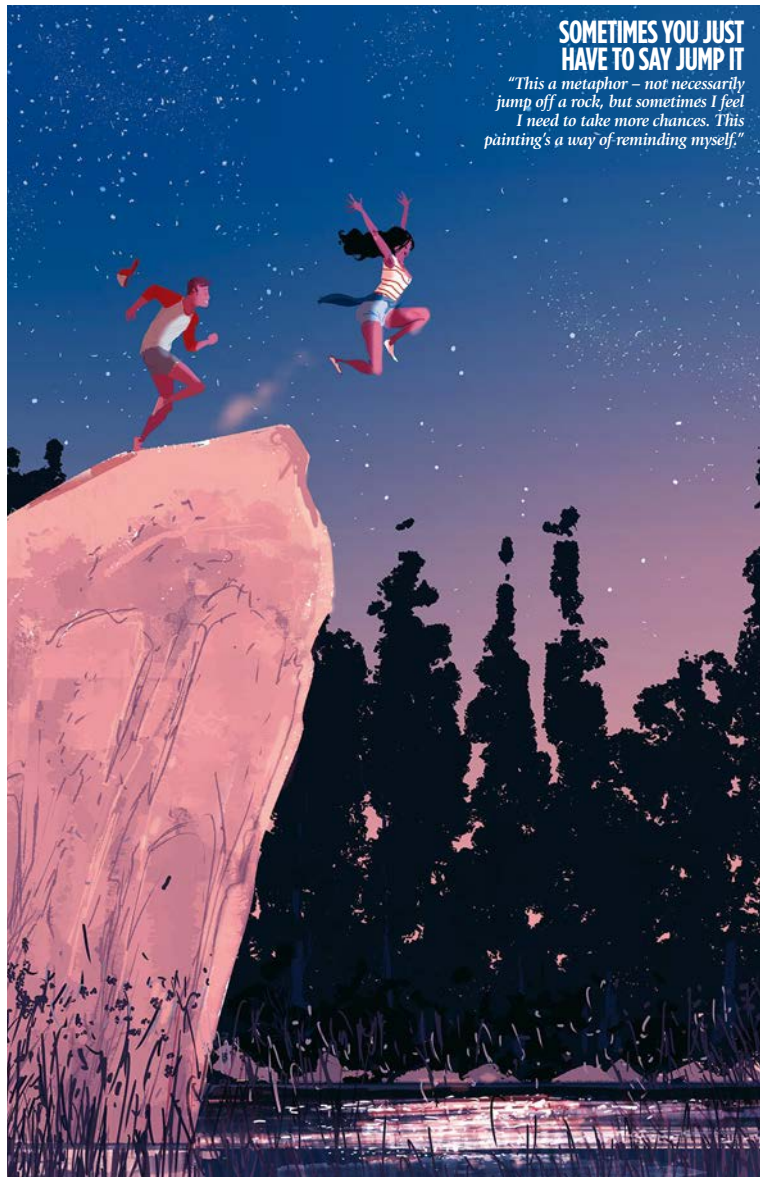
**DUSK**

"When I'm based in a studio, I work from home and like to paint in the morning. I created this image during one of those days when I was feeling tired and relaxed."



**SEE, SEE, SEE**

"We used to do this with the kids a lot – look up and see what shapes we saw in the clouds: 'There, that one's a dinosaur!'"



**SOMETIMES YOU JUST HAVE TO SAY JUMP IT**

"This a metaphor – not necessarily jump off a rock, but sometimes I feel I need to take more chances. This painting's a way of reminding myself."

➤ then it has to go. He likes it when someone who knows nothing about art can relate to his work.

"I'm trying to get the emotion to be the story," he says, "without making an abstract painting or a gratuitous one. Not that I have anything against simply beautiful images. I just have a hard time making them myself, so I stick to what I understand. I try to push my understanding and question it as much as I can. That's the French in me, I think."

## DAILY ROUTINE

Pascal wakes up at five in the morning and draws for a couple of hours before taking his kids to school. He bikes to the Los Angeles studio where he works as art director on Green Eggs and Ham, an

animated Netflix series by Warner Bros.

If he's not there, he's at home, always working in the morning, since he's a little slower come afternoon. He doesn't like to work late and keeps a good routine because this approach gets "ideas flowing at a specific time."

Aside from the Warner Bros. projects, Pascal is working on several covers for books and for Marvel comics, a video game, more commercials, and more development work. His dream project in a cover for The New Yorker magazine.

Spurring him on to greater achievements is his first major setback: his childhood art teacher. "I think about him every other month or so," Pascal says. "Funny how that works. I'm spending the rest of my life trying to prove him wrong." 🍌



# REBELS WITH A CAUSE

The **Lucasfilm Animation team** discuss how they created a single image to represent the story of Star Wars Rebels

## HOMAGE

The opening scene of Star Wars Rebels sets the TV show's tone: a return to the look and feel of the original 1977 film

**E**zra Bridger stands beneath a low-flying Imperial Destroyer. As it rumbles by overhead, the warship casts a long shadow over the young rebel. This, the opening scene of Star Wars Rebels, sets the tone for the whole series: a return to the look and feel of the franchise's original 1977 film.

The team behind the animated TV show – which premiered on US channel Disney XD in October 2014 – says Ralph McQuarrie's original trilogy concept art was a big stylistic influence. In a key frame created especially for 3D World, Lucasfilm came up with an image that captures the essence of the show, Ezra's journey from teenage thief to hero.

"The posing," animation supervisor Keith Kellogg says, "is accomplished using the tried and true method of contrapposto – which makes characters look heroic, rather than bland cutouts. Ezra staring out into the vast

beyond highlights the hero's journey he is about to embark upon. Kanan, the mentor – slightly behind but still beside Ezra – represents the help that Ezra will receive. The Star Destroyer was put in to show the approaching darkness and struggle that the characters would need to overcome. We added in the Ghost swooping in overhead to help sell the existence of the other characters on the show."

## Developing the render

The image began with a quick sketch, which executive producer Dave Filoni created. Senior designer Chris Voy worked on the lighting concept in Photoshop:

"McQuarrie's work has been a huge influence on the art of the show, so we referenced his palette here by picking vivid complementary colours for the light and shadow sides of the characters. We tried to delineate rim light but kept shadows nice and soft. I painted a few variations so we could get some ideas worked out before settling on the final version to light."

In Maya, Keith used Dave's sketch to position the camera and the characters. VFX/CG supervisor Joel Aron then took the scene and set up lighting to match the look of Chris's work.

"Once I was close to complete with the set, vehicles and characters," Joel says, "I assembled each layer in Photoshop, where I dialled in final colour-looks and paint-retouching. Chris then went in on top of my final renders and did further cleanup to the sky and the characters. I took the complete image and sweetened it, as we do with the production shots – a final colour grade that pushes the contrast and tone. Lastly, I added the edge treatment and film grain, processes that are identical to our final shot look for the show." ●

“We referenced McQuarrie's palette by picking vivid complementary colours for the light and shadow sides of the characters”

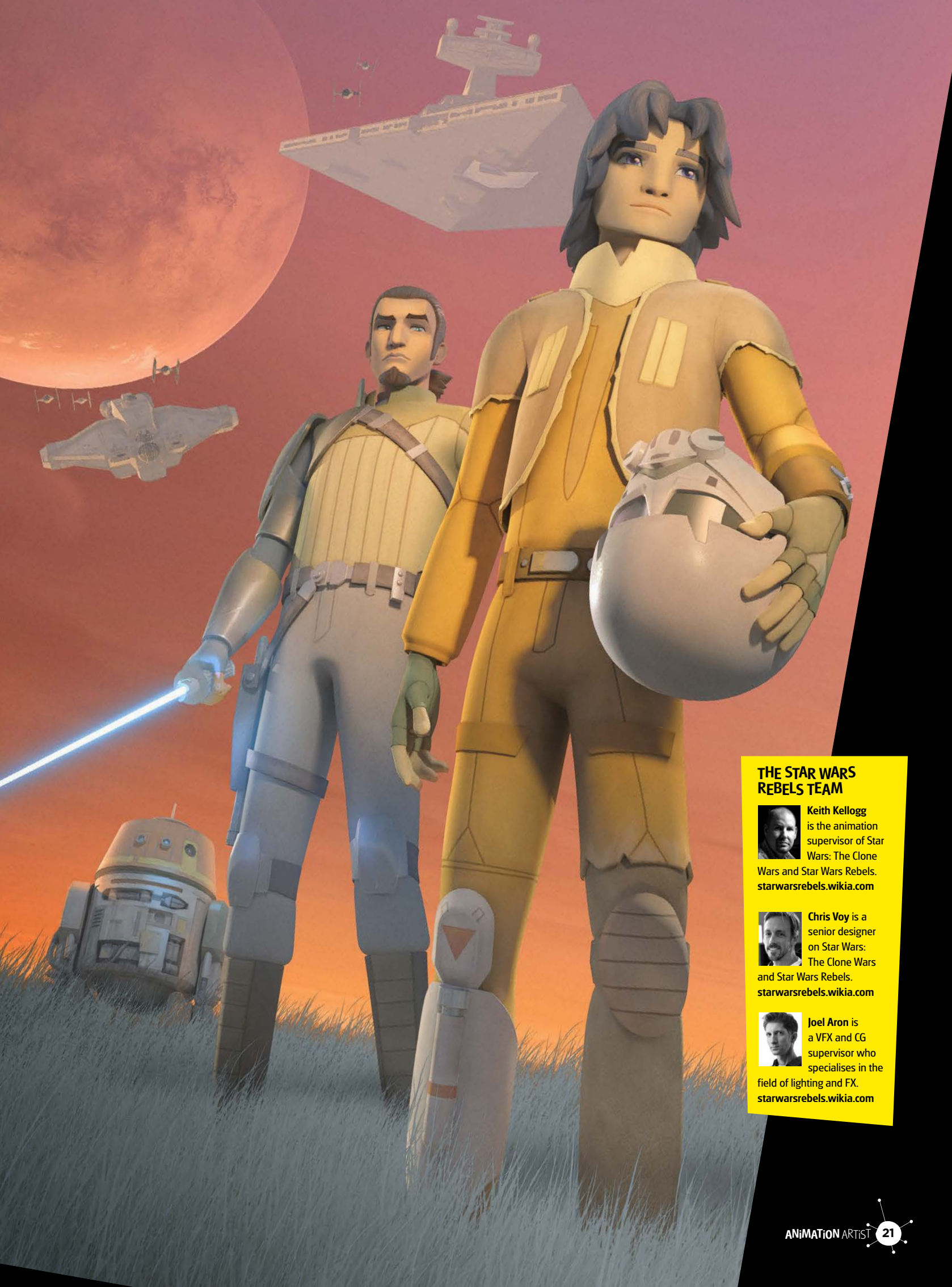
## MODEL

Animation supervisor Keith Kellogg posed the main characters, such as Kanan Jarrus



© Lucasfilm Ltd





## THE STAR WARS REBELS TEAM



**Keith Kellogg** is the animation supervisor of Star Wars: The Clone Wars and Star Wars Rebels. [starwarsrebels.wikia.com](http://starwarsrebels.wikia.com)



**Chris Voy** is a senior designer on Star Wars: The Clone Wars and Star Wars Rebels. [starwarsrebels.wikia.com](http://starwarsrebels.wikia.com)




**Joel Aron** is a VFX and CG supervisor who specialises in the field of lighting and FX. [starwarsrebels.wikia.com](http://starwarsrebels.wikia.com)









# KUBO AND THE TWO STRINGS

Mixing CG, VFX and 3D printing, Laika's fourth stop-motion movie pushes the medium to new heights, **Barbara Robertson** meets the team...



**T**he animation studio behind *Coraline* and *BoxTrolls*, has upped its game once more, delivering outstanding action on a large scale with *Kubo and the Two Strings*. In a dramatic scene early on in the feature, the child Kubo and his mother ride precariously in a small boat that flounders in a violent ocean. To save them, Kubo's mother uses the pick from her Japanese lute to magically part the sea. The scene is a great achievement for a stop-frame animated film, and it's only the beginning of the technical and artistic virtuosity in this breakthrough feature.

Directed by Laika CEO Travis Knight and based on a story and character designs by Shannon Tindle, *Kubo and the Two Strings* is a fantasy action adventure set in ancient Japan. The human and mythical characters wear elegant kimonos and have elaborate forms. Some characters are even origami.

"It's pretty unorthodox for a stop-motion movie," says producer Arianne Sutner. "It's a quest movie with large exteriors and big characters. It's mythological. But at its centre, it's an intimate family story."

"Action in stop-motion is nigh impossible," explains Travis Knight. "The spirit of spontaneity is not something the medium does well, but I wanted to try. What really got me excited, though, is the emotional core, the story of a boy and his family and what becomes his surrogate family."

3D computer graphics helped tell this story in two ways: Laika's Academy Award-winning 3D printing team broke new ground by printing an entire puppet and two characters' heads in colour in plastic. The visual effects crew crafted water

for the incredible ocean scene, extended sets, and created CG crowds beyond what they had achieved in previous movies.

Although Laika continued to print face parts for Kubo and all the other human characters' expressions with 3D Systems' powder-based printers using techniques developed for *ParaNorman* and honed for *BoxTrolls*, the characters in *Kubo* demanded new techniques.

"Powder-based parts are fragile and prone to inconsistency and breakage," says Brian McLean, director of prototyping. "When we looked at the mythical creatures in *Kubo*, we saw a sharp nose on the Beetle's face. The Monkey had hair all over her face. And, Moon Beast had translucent elements. With the powder-based printer, the Beetle's face would end up rounded, and Monkey's hair would break. We had to change the character designs or find a new way to do them."

## Plastic in colour

Laika had first used Stratasys' plastic-based system for *Coraline*, hand-painting the parts to colour them, and still used that system for internal components. So, Brian called Stratasys to see if the company might be working on a colour printer. They were, and they were looking for beta testers. Brian explains: "The machines had wonderful capabilities. All the things we loved: dimensional accuracy, fine detail, workable nested parts, live hinges, things that moved. The problem was that the software was antiquated. Operators had to assign colours based on closed surfaces, on shells. Eyebrows needed a separate shell, for example. It was painting by number and impossible to get gradients."

For the powder-based faces, the Laika crew created a UV texture map in Photoshop, wrapped it around the 3D



# FEATURE

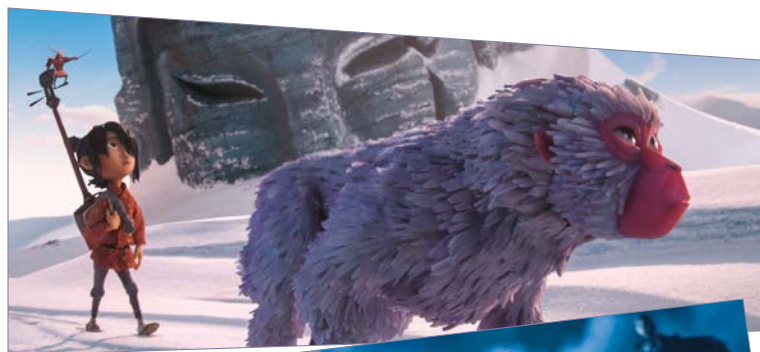
## COLOUR IS KEY

New colour 3D printing techniques were experimented with to ensure the puppets for Kubo and the Two Strings looked as close as possible to their CG concept designs.





# KUBO & THE TWO STRINGS



## GETTING REAL

Developing a new way of creating stop motion animation meant treating the puppet cast like real actors.

➡ object, and sent it to the printer. But, the Stratsys printer couldn't use texture maps.

John Hiller, an independent software developer suggested by Stratsys, helped Laika bypass the printer's software and create the colours they needed for Kubo.

"Using John Hiller's software, we could feed in a texture map," Brian says. "The software would identify a colour or a gradient and get the needed combination of colours from a lookup table."

However, Stratsys' Connex 3 printer had the ability to mix only three colours of the five available at one time: cyan, magenta, or yellow, plus black, and white.

"We could now print texture maps with gradients, but the question was whether we could match a compelling character design using three colours," Brian says. "It took creative problem solving."

They settled on magenta, white, and cyan for Monkey's face; and black, yellow, and magenta for Beetle's face. Then

**“ We have to use subdivision surfaces. On a real puppet, they plug hair into little slots and have an intricate layering system. We had to match that ”**

## CROWDS OF CG STOP-MOTION PUPPETS

Look development lead Eric Wachtman explains the complexity of the CG crowds for Kubo and the Two Strings

Before the visual effects team began work on the CG crowd characters, look development lead Eric Wachtman gathered samples of all the fabric they would create digitally from the puppet costume team.

"We looked at the fabric under a microscope to find weave patterns if any, and then came up with procedural systems inside shaders for weave creation," explains Eric. "Everything is digital. We didn't use texture maps."

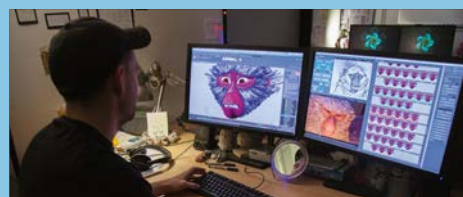
Although the 45 characters the team would create shared the same topology, each wore a unique costume. Modellers created the costume shapes with Marvelous Designer software.

For the crowd characters' hair, the team modelled guide curves and used custom RenderMan procedures to generate the hair.

"Often, we can't get away with flat ribbons," Eric says. "We have to use subdivision surfaces. On a real puppet, they plug hair into little slots and have an intricate layering system. We had to match that."

To provide lighting and depth of field reference for the virtual camera, a survey team had stand-in puppets in costume walk around.

The effects team didn't use crowd software to create the characters; they positioned each carefully crafted CG character in the live-action plates.



came Moon Beast, a huge (by stop-motion puppet standards) spiny, translucent, and luminescent character.

"We knew he could benefit from being printed with plastic, but there was no way we could achieve him with only three colours," Brian says.

## Thinking out of the box

To make Moon Beast a reality, the team did some creative thinking: "He had translucent elements," Brian says. "We were shooting stop motion, so we wondered if we could photograph him under different lighting exposures and use each as a mask." After running a battery of tests, the team soon discovered that if they created a gradient using the ➡



## UNSUNG HEROES

Visual effects supervisor Steve Emerson explains the unique process used to create facial expressions

Laika animators create facial expressions using sets of 3D printed parts. It's up to the roto-paint artists to erase all those thousands of lines; they paint them out as they have done since *Coraline*. For *Kubo*, though, they upped the game.

"The puppets have a face mask, an eyeball, and an animate-able eyelid," says Steve. "This time, for the first time, we painted out the gap between the eyelid, the eyeball, and the face mask. We tried it and it was so interesting that Travis [Knight, director] rolled with it. We'd never seen anything like it before. It gave the puppets more of a human quality."



➡ white and black resins, the white would pop and the black would fade to invisible.

"We worked with the visual effects team on this," Brian says. "We printed Moon Beast in black, white, grey and clear, then photographed him under different lights. VFX used each photograph as a different mask. We got shimmer, gold, glows. It was amazing, and a huge leap of faith."

Moon Beast became the first puppet printed entirely with a 3D printer. It was also the first time animators used a puppet that would look different in the final shots.

"It was nerve wracking," Brian says. "The puppet didn't look like the artwork until post-processing."

A proof of concept test during production, though, convinced everyone that the technique would work, and justified installing another printer.

"Because the printer could use only the three colours and replacing resin is a long laborious process, we had separate printers for Monkey, Beetle, and the Moon Beast," Brian says.

### CG water in Kubo's world

The 3D printing team gives Laika's filmmakers the freedom to have puppets with nearly unlimited facial expressions and to work with puppets difficult if not impossible to create in any other way. The visual effects team expands the world in which these puppets perform.

Despite its name, stop-motion animation is live-action filmmaking even though the 'action' takes place one frame at a time as animators position and reposition puppets on stage

### PERSONAL PRINTS

Each lead character had its own 3D printer set to its colour requirements.



sets. Thus, visual effects artists at Laika employ similar techniques and have similar roles as their counterparts in the live-action world. They build environments, extend sets, and create CG characters. Their toolset includes Maya, Katana, Nuke, Mari, Houdini, RenderMan Reyes and RIS.

"Kubo pushed us harder than any of our past projects," says visual effects supervisor Steve Emerson. "Kubo goes on a worldwide odyssey through mythical Japan and we knew out of the gate that we would be heavily involved in those environments. And, Kubo is a storyteller. When he tells a story, crowds in the village gather. We knew we would need to create CG extras."

The biggest CG environment and arguably biggest challenge was the ocean, which needed to be too big and too active to create practically. "We had never done water with this scope at the studio before," explains Steve. "My priority became finding a water specialist."

That specialist was David Horsley, who had received a VES nomination for the water simulations in *Life of Pi*. "We knew he could deliver photorealistic water from day one," Steve says. "So from then on, we worked with David to make the water feel like it belonged in Kubo's world."

Oliver Jones, who rigs practical models, provided animation tests of water created with practical materials for reference. "We looked at those and at the artwork to come up with our design aesthetic," Steve says. "Then, we got to work."

For calm waters, the team used fractal patterns in Houdini. "We wanted a lot of negative spaces and surfaces balanced ➡



# KUBO & THE TWO STRINGS

## LIVE ACTION EFFECTS

The VFX team at Laika employ similar workflows to live-action film, software includes Maya, Katana, Nuke, Mari, Houdini, RenderMan Reyes and RIS.







## HIDDEN CG

Every scene in Laika's films is touched by CG, whether you realise it or not.



# KUBO & THE TWO STRINGS



## CHARACTER FIRST

Laika's success is built on delivering believable characters and performances.

➤ nicely with areas of dense information,” Steve says. “We could do that quickly in fractals.”

For choppy water, Oliver had built a physical rig made of iron on which he had layered various materials, and then he was able to animate the rig.

“We keyed in on patterns we could blend with an ocean simulation to get a Kubo look,” Steve says.

“We wrote a herringbone whirly pattern in Houdini and RenderMan and had a mix between a displacement shader and an ocean simulation,” says look development lead Eric Wachtman, explaining: “The shader is attached to the simulation and they work together. David orchestrated the blending back and forth.”

For the big waves, the crew referenced the artwork, and then created a single plane with a wave simulation on it.

“We used hand-painted textures and procedural animation; procedural displacement,” Eric says. “We hand-painted the texture and detail in Mari and used flow vector maps to give the illusion of movement. Then we added the procedural displacement to have this water jibe with other water we had established.”

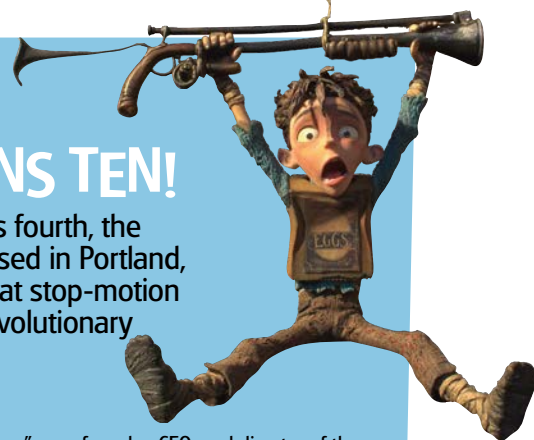
For the shots in which Kubo’s mother parts the sea, the team created the surfaces with mesh geometry and then added foam, spray, and splashes with particles on top. Look development for the water took about six months and it was a year before the team felt like they were in a groove.

“We never want the VFX to be intrusive,” emphasises Steve. “Hopefully, the first time you see it you just respond to water. Then if you look again, you might notice the cool design aesthetic that’s in there. We wanted something beautiful that belonged in the world.”

Creating CG water was only one way in which the visual effects team helped transport the puppets and the audience into the gorgeous, magical world of Kubo and the Two Strings. The striking film is a powerful example of how a seamless blend of 3D technology, CG visual effects and stop-motion can create something unique and beautiful. ●

## LAIKA TURNS TEN!

From its first film to its fourth, the little studio that’s housed in Portland, Oregon has proven that stop-motion films are viable and evolutionary



“I’m proud of the innovation here,” says founder, CEO, and director of the current film Kubo and the Two Strings, Travis Knight. “We’ve taken a stodgy art form to a place it’s never been before. What I’m doing now is the most satisfying and creative thing I’ve ever done.”

In terms of crew size, the studio hasn’t grown much in 10 years. The total staff for the studio’s first film, Coraline, was 450. The total staff on Kubo, was 472. It gives the studio a fun, family feel.

“I think the biggest change in a department in terms of numbers is the rapid prototyping department,” says producer Arianne Sutner. “We have more people in that department supporting replacement faces.”

The rapid prototyping department is responsible for Laika’s main innovations in puppetry. Laika’s Brian McLean and Martin Meunier received a Scientific and Engineering Award from the Academy in 2016 for their pioneering use of rapid prototyping for character animation in stop-motion film production.

“We were probably the first to do replacement animation,” Arianne says. “And, we’ve continued to improve our character animation, learning how to make [the puppets] emote in subtle and human ways.”

The second innovation has been in the use of visual effects to push the puppet world off the “table-top” and into expansive environments with crowds of characters.

“The goal Travis [Knight] had in the beginning was to tell stories in any genre,” Arianne says. “But, there were limitations with stop-motion and as a producer, I would veer away from scripts with too many characters or too much action. The technology to do what we felt comfortable doing wasn’t there 10 years ago. But now I’m working on an incredible action adventure. It’s dynamic and we’re able to do it. There’s nothing we’re afraid of trying. We want to take on bigger challenges — a movie every year. It’s wonderful that Travis is committed to making these movies.”

Arianne and Travis attribute Laika’s success in part to the stability of the team. “We’ve had 10 years of keeping the band together,” Travis says. “We can do things now with camera, lighting, set fabrication, visual effects, faces, and so forth, that we couldn’t have done four years ago. It’s unusual for a stop-motion team to be together as long as we have, but because of that, we can do these things.”

The studio’s success is also tied to the willingness to experiment with new technology. “We don’t stick to certain rules,” Arianne says. “We have breakthroughs on every film. The goal is not to be limited by or defined necessarily by stop-motion but by the movies we’re making. The way we work is unique. All our characters move a frame at a time; they’re real things in space with real light, and there’s a magic to that. But, no part is not touched by CG. We don’t do that because it’s easier. We have a reason. It becomes something new on the screen. I wish we could come up with a name for what we’re doing. Maybe we should call it LaikaMotion.”



# MAKING THE GOOD DINOSAUR

**James Clarke** uncovers Pixar's creative journey to  
bring a dinosaur and his boy to the big screen







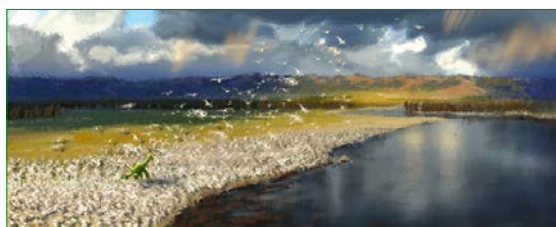
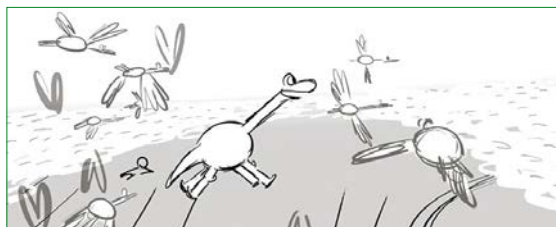
Pixar doesn't do things the easy way. Many of its major releases have been shelved, redeveloped and reworked before an eventual, delayed release, including Toy Story 3. The Good Dinosaur is on that list. The film is about a dinosaur and his human companion overcoming dangers to find a way home, and itself had to clear many hurdles, including characterisation, setting, tone and the creative challenge of telling a story that offers a fresh take on a classic scenario. Director Pete Sohn, story artist Kelsey Mann and animator Mike Venturini reveal how and why The Good Dinosaur is one of Pixar's most ambitious films...

## Big country, big picture

The 2009 Pixar short Partly Cloudy has a mood about it that's best described as lyrical. Instead of the highly kinetic style of, say, For the Birds, Tin Toy or Boundin', Partly Cloudy has a softer feel – appropriate, really, given the subject of the story. That short film was directed by Pete Sohn, and The Good Dinosaur is his feature-film directing debut.







Scenes develop (left, top to bottom) from storyboards to concept paintings (this one is by Sharon Calahan pictured below) before they are modelled, initially as wireframes. Then the shading team get to work painting and texturing. It's only after all this that character animation and lighting effects are added (main image, above).

➡ Bob Peterson, screenwriter of Pixar's acclaimed *Up*, "originally pitched a fun flip of a boy and a dog," Pete explains. "So, digging into that, we started to build this story of survival and coming-of-age." Despite the dinosaurs, Pete (pictured below) uses the words "real and true" to define a key sensibility in *The Good Dinosaur*. The fantasy elements are never allowed



to overwhelm the heart of the story.

"When you think it's a simple story," adds story artist Kelsey Mann, "it's harder. Because it's so simple, there's nowhere to hide when you're reducing the story down to a couple of elements."

## Getting a grand view

That said, one of the standout elements of *The Good Dinosaur* is its high-adventure settings. These take their frontier realism from crew research visits to Wyoming and Idaho, but Pete emphasises that the point is not to make the settings look real but to heighten the action of the film.

Kelsey stresses that Arlo, the dinosaur protagonist, "feels he needs to get home, so the environment he is in needs to feel





# THE GOOD DINOSAUR



## MORE THAN REAL

The scenery renders are based on actual US Geological Survey topographical data and satellite images.

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hard. We needed it to feel unsafe and not ‘designy’.” Pete adds that initially “we tried a world where the trees were a little more graphic,” but this “sort of watered the danger down.”

Referring to the film’s production design (by Harley Jessup), Kelsey explains that “the art department at Pixar are making decisions to support the story. You want the environment to reflect what’s going on in the story, and in Arlo’s story everything should be supporting the theme. We

“You want the environment to reflect what’s going on in the story, so if Arlo is having trouble in his world then the river’s difficult”

wanted the river to match what was going on in Arlo’s life: if he was having trouble in his world then the river’s difficult.”

There’s a long cinematic tradition of using settings in this way as much more than just backdrops. Pete admits: “I come from the East Coast. The only way I know these places was through the movies.” He goes on to cite the inspiration of the Westerns of John Ford and George Stevens’ *Shane*, and makes special mention of Akira Kurosawa and how his films “showcase the terrain.” He also references the influence of another Japanese filmmaker: animator Hayao Miyazaki. In many ways, as in these influences, the environment of *The Good Dinosaur* is one of the largest “characters” in the film.

To support bringing the river to life in this way, the production team created more than 200 shots of the river, which could be combined with almost infinite variation. ➡



## ANiMATiNG THE WORLD

How an environment can become a character

Of *The Good Dinosaur*'s expansive feel, Mike Venturini (pictured below) explains that it captures "the beauty and danger of nature: it's breathtaking and in the next moment dangerous. We've never



had a film with an environment this big. Usually, you'd use matte paintings. We have no sky-matte paintings in our film." Instead, the production worked with digitally rendered clouds comprising millions of particles. This approach

allowed for increased nuance in the presentation of the environment. For the movie's landscapes, terrain-mapping technology was applied in order to exactly translate the geometry of particular real-world locations to the virtual environment of the film. Pete notes that in building the prehistoric world, "this is one of the first films where we've wanted to push the scope of the movie."

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# THE GOOD DINOSAUR







“The design reflects the personality of the character. Arlo’s young and a bit delicate; Spot is tenacious and blunt and wild like a dog”



# THE GOOD DINOSAUR

## NO FOOLIN'

The movie plays with your head, casting the ferocious-looking T-Rexes as cowboys.



➔ For animator Mike Venturini a particularly satisfying part of working on *The Good Dinosaur* was that “Pete let the design reflect the personality of the character. Spot is really tenacious and bullheaded and Pete wanted his face to be square and blunt. He’s kind of a blocky little character. Arlo’s young and a bit more delicate and then there’s this egg shape to his body and round edges. It’s a gentle design.”

## Characteristically thoughtful

Pete elaborates: “Originally, we had a blocky Arlo. We wanted to play on the idea that Arlo is a boy. Arlo is a kind of stranger in a strange land. He was originally a man-child but I brought him down to this 11-year-old. How do you make a dinosaur

feel like an 11-year-old boy?” Pete explains that two details were key to expressing this boyishness: knock-knees and a wondrous look in Arlo’s eyes. By contrast, Spot, Arlo’s human companion, is described by Kelsey as being “wild like a dog.”

During the story of *The Good Dinosaur*, Arlo and Spot take up with a number of T-Rexes. “Our T-Rexes are so



rugged – there’s an angularity to them,” notes Mike of their character designs. “We went with a stoic cowboy-on-a-horse feel for them, and their design allows for this.”

For Kelsey (pictured left), *The Good Dinosaur* is “really different.

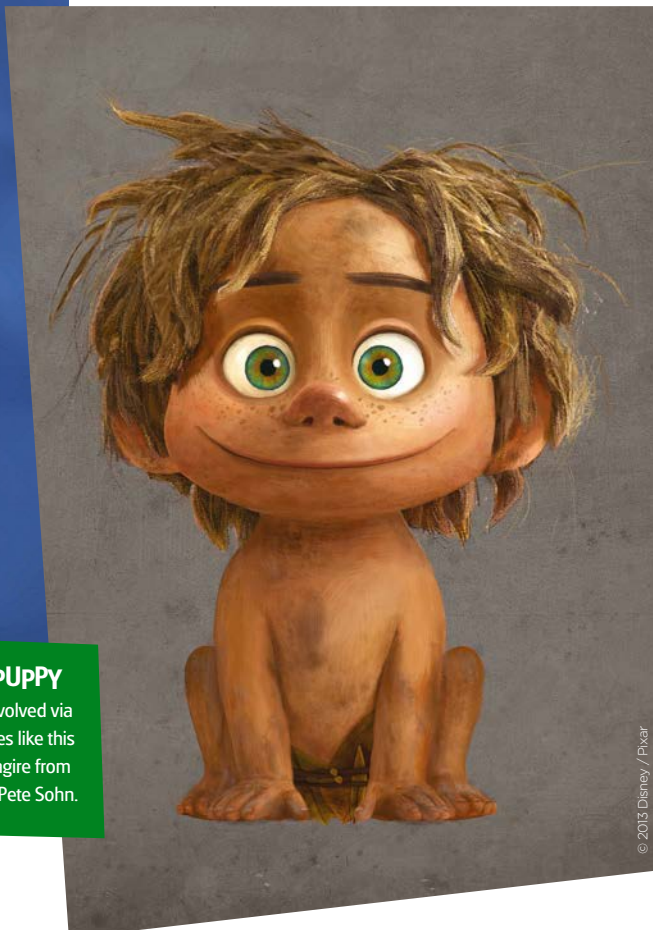
It’s not what you would usually expect from Pixar or family films. I feel like only a place like Pixar can make this movie.”

*The Good Dinosaur* places a sense of wonder at the heart of the film. The crux of the journey lies in finding moments of wonder when the two characters can be in awe of something. Pete explains that part of this process allowed the crew “to have fun with scale in different ways,” such as in the very obvious difference between a dinosaur and a firefly, allowing them to “push that type of lyricism,” as Pete describes it. ➔



## LIKE A PUPPY

Spot (left) evolved via colour studies like this by Bryn Imagire from sketches by Pete Sohn.



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## MIKE VENTURINI'S PRO TIPS

A guide to smart-thinking your animation



**1** “I used to teach animation. One of the most critical tests is a pantomime-acting test. In this film we didn’t have a lot of dialogue, and it means thought-through action without words”

**2** “Capture a detail and make it tangible!”

**3** “When you don’t have the words and you have to consider what’s in their head, you come up with really specific choices”

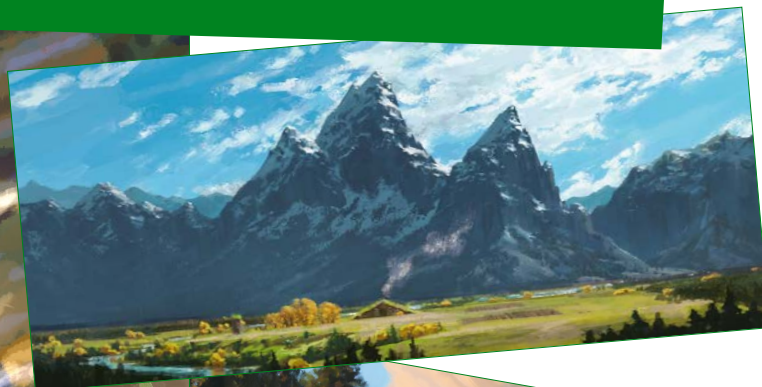
**4** “Always approach your animation from a place of what your character is internalising: what they are thinking, feeling and reacting to”

**5** “Be in tune with showing reactions to all of the environment”

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### PLAYING WITH LIGHT

Evocative lighting studies by Director of Photography Sharon Calahan, and concept art (top right) of Clawtooth Mountain.







## QUIRKY CHARACTERS

The Pet Collector proves that Arlo isn't the only one with a pet...

➡ Mike notes several instances that he feels exemplify the film's creative strengths, with key scenes being those without dialogue, "Where we see Spot offering Arlo food. I thought the acting was phenomenal," says Mike as he describes how the subtle hesitations between Arlo and Spot echo a key sequence in *The Black Stallion*, directed by Carroll Ballard. "We used *The Black Stallion* in the animation department. Mostly we focused on the [scene of] the boy waking up on the beach and trying to befriend the horse. That relationship plays out in complete silence. We thought it'd be so great to do a film in that style. Ballard was a great inspiration for us on this film."

Mike also points to a scene in which Arlo and Spot are camping and telling each other about their respective pasts. For Mike this scene embodies "the maturity of the animation to pull a performance out of silence."

## Lyrical beauty in the beasts

Returning to the essential challenge of the storytelling required for *The Good Dinosaur*, Pete notes that an interesting challenge of the work was exploring a narrative that is "very archetypal and simple: we've embraced that, so that we can exploit it in the lyrical."



## FEATHERY FOES

The cattle-thieving raptors have a distinctive look of their own, very different from Arlo's.

Regarding the film's tone, Kelsey explains that "it's more pensive. It's not filled with activity and jokes." Kelsey says of the relationship between story development and conceptual art development that "when the story zigs, the art zags. To make a character come to life is one thing, but to make a character that you are emotionally attached to is what I'm most proud of. It's really hard to create characters that you care about."

Pete's concluding comments stay with what's emotional in describing his experience of bringing Arlo and Spot's big adventure to the screen: "Building the relationship between these two has been an inspiring parallel journey with my own making of the movie. Arlo's naïve to the dangers of the world. It's been very moving for me." ●







# STYLISTED CG: THE JOURNEY

**Emilie Stabell** shares how she turned a 2D illustration into a 3D masterpiece



Sometimes a piece of artwork just demands to be rendered in 3D, and that was the spark that ignited Media Molecule's Emilie

Stabell to spend a year adding an extra dimension to a beloved 2D image.

Emilie is fan of illustrator Sam Bosma, and in particular his concept Stability. "When I showed his illustration to a friend, I joked: 'Imagine if I made this in 3D. It would be absolutely insane.'" Not long after that, I began modelling the first asset. The sheer scale of the project was quite overwhelming, though, so on the first day I started by creating a cube in Maya, and that was it: a small beginning."

Emilie says her workflow was very simple: Maya was used for modelling, Photoshop for texturing and ZBrush was used to project from the concept. Once her 3D model was complete she rendered using Maya Hardware 2.0, and also used After Effects and Photoshop to add the finishing touches to the animated scene.

## Start simple

Emilie began by blocking out the assets in Maya, using an image plane of the concept and setting her camera to front view. Using simple primitives, she was particularly careful to make sure the silhouettes matched the illustration. "Since the geometry is flat-shaded and wouldn't be deforming, it gave me a lot of freedom in how many pieces each asset can consist of," says Emilie. "As long as I ➡➡







## THINKING AHEAD

"I make sure that my model doesn't cover up the outline on the concept," explains Emilie. "I'm going to need that little bit of extra space for when I add my own 'toon' outlines later."

## TEXTURE CONTROL

"When texturing in Photoshop, you want all the layers you paint on to be 'clipped' to the mask at the bottom of your group. This will keep your structure simple and easy to navigate. Use your ZBrush texture as a guide to where the details are positioned on the model."

## “ Each asset was treated as a separate, miniature project, so that painting remained fresh and fun ”

➤➤ was satisfied with the look of my silhouette from all angles, I knew I was on the right track. In a sense, this project was devoid of many of the usual technical, and tedious, aspects that go into creating successful 3D, which is most likely the reason why it kept being fun to work on the entire way through."

How the lighting hit the geometry also became irrelevant. "As long as the silhouette looks good, you're on the right track," says Emilie, explaining how focusing on the front view to match her geometry with the illustration is very forgiving for objects on the Z-axis: "As long as they're overlapping in the right order... It's really a rather flexible, different and fun way to do 3D."

Emilie loved seeing all of the disparate parts come together to bring the image to life. "I have never created anything of this scale, and proving to myself that I had the persistence and motivation to do so was a wonderful experience," says Emilie. "From a technical point of view, painting the textures gave me a lot of joy. Each asset was treated as a separate miniature project, so I never really managed to get tired of a specific part of the pipeline, and painting remained fresh and fun."

## Come together

That painting process began in earnest once the silhouettes were finished, Emilie then created the UVs and exported the mesh as an

.obj file and took it into ZBrush. "I projected the texture from the concept to use as a guide for the hand-painted textures I made in Photoshop. I imported the .obj file, divided the geometry a few times to get a good amount of resolution for the Polypaint and then positioned and scaled the model so it was ready for projection."

The next step involved using Spotlight to import and project the concept onto the mesh. Emilie checked her projection work was okay and then exported the files by going to Zplugin>Multi Map Exporter, and choosing Texture From Polypaint.

With her texture exported from ZBrush and opened in Photoshop, Emilie moved into Maya and took a UV snapshot of the assets' UVs to set as a layer on top of the ZBrush texture. She then created a mask for all of her UV shells and grouped them into appropriate subgroups for ease of use, in this case: bird, wing, thighs, legs and so forth.

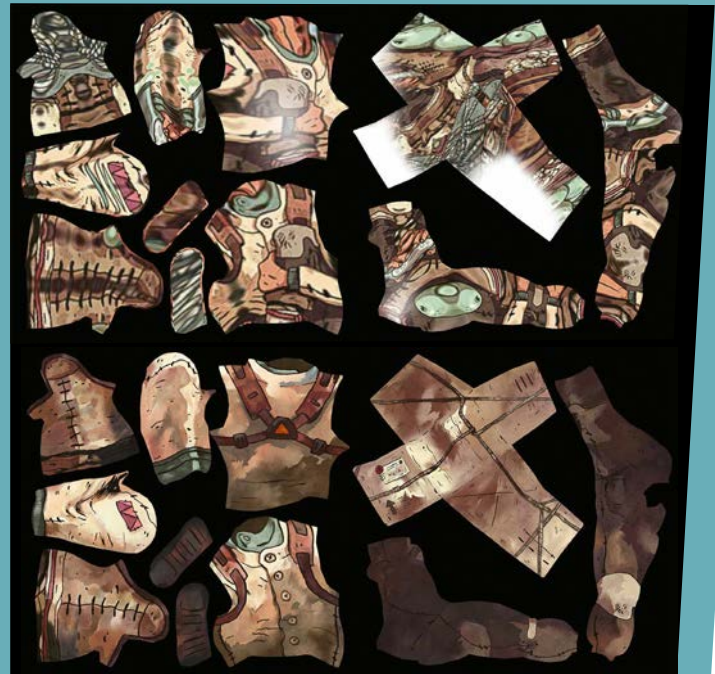




THE JOURNEY  
ALL 3D assets  
Concept by Sam Bosma

## BiTs and PiCes

An overview of all the main assets Emilie created throughout her lengthy process – over 200 in total.



## EXPORTED TEXTURES

Making textures is hard work, but the results are worth it

Here you can see an example of what a texture looks like when exported out from ZBrush. “Below it is my finished texture painted in Photoshop,” says Emilie. “You will get a good sense of the before and after, and just how much work goes into the making of the texture. The projection simply provides a rough guide to where important aspects such as eyes and key details go on the model – the rest is up to you.”

“This approach allowed me to create clipping masks for each group so I needn’t worry about ‘colouring within the lines,’” explains Emilie. “Another important thing to note is to always make sure your masks are a couple of pixels wider than the actual UV shell, otherwise you might run into issues with Maya displaying black edges around the seams.”

When it came to the painting, Emilie began by applying a flat base colour to everything using the Paint Bucket Tool and her own brushes: “Then I quickly painted some rough gradients and colour vibration using my Awesome Paint 1 brush. At this stage, I didn’t worry about precision at all, as it was simply a case of applying some nice gradients and bold colours,” she says.

Once she had something decent to work with, it was time to switch to the Smudge Tool using her Smudge Blender brush: “This brush is optimised for the tool, so I didn’t get any of the lag you’d normally experience when using

Smudge. Furthermore, it left behind a bit of texture, creating that nice, painterly effect. From here on, it was a process of going back and forth between painting and smudging until I was satisfied. Lastly, I drew the inner line art, as I planned to apply an outline as my final step,” she explains.

## Keep going

As you can see from her workflow, Emilie’s task to texture and paint every asset by hand was a mammoth effort that involved creating over 200 assets. “The hardest part was keeping at it and not giving up on it halfway through,” she says, adding: “When I had done roughly a third of the work, I had a short period of time where I really had to push myself to keep going. The sheer amount I knew I had left to do, made it seem like I would never finish.”

This is when the plan to treat each asset as a separate project came into its own: “Without this type of workflow, I am almost certain that

I would have canned the project long ago. Hence, I want to stress the importance of planning, folder structure and consistency. They are your best friends when doing something of a larger scale.”

But the end was in sight, the assets had been modelled, textured and positioned, and Emilie just had to build her surrounding scene as depicted in the concept. “I started by setting up a camera with a simple 180 rotation around the model and built the environment from there. This is also the point in time where I started to think about how the environment is supporting the narrative and is helping enhance the original concept,” she says.

As the story concerns a group of explorers hunting for pirate treasure in a vast dried-up ocean, some of the scene’s elements – such as a pirate flag, a sunken ship and a chunky, rusty metal piece emerging from the sand – were designed and modelled to support the narrative. “I wanted to hint at the story.” ➔



## APPLYING LINE ART

Adding the final outline to 3D images like the ones in this project is easy

"In order to add a final outline for your images, simply go to Rendering in the dropdown menu in Maya, select the model and go to Toon > Assign Outline > Add New Toon Outline.

In the attribute editor, you'll find a few helpful sliders to tweak the look. The first thing I do is to change the Profile Lines from Paint Effects to Offset Mesh as this will allow you to smooth the outline. You can now go in your Outliner and select the ProfileMeshes group, and either subdivide it or simply hit 3 for a smooth preview. Now you want to tweak the Line Width under the Common Toon Attributes. Here you can play around until you get a thickness that you like.

Next, you'll have to decide if you want Crease and Intersection Lines, which are also found under the Common Toon Attributes. I tend to stay away from Crease Lines as they usually don't look good; Intersection Lines are sometimes helpful, but this depends on your project.

The final thing to do is to choose the colour of your outline. You do this by expanding the Profile Lines menu below the Common Toon Attributes menu and setting your Profile Color. If you've chosen Intersection Lines or Crease Lines, the colour of these can be changed in their respective menus as well.

Once you're happy with the look, all that's left to do is to clean up the scene and you're ready to go. To do this, delete any unused notes as well as the reference plane, save the file and that's it! You've now created a finished beautiful little asset that's ready to be imported straight into the master scene."



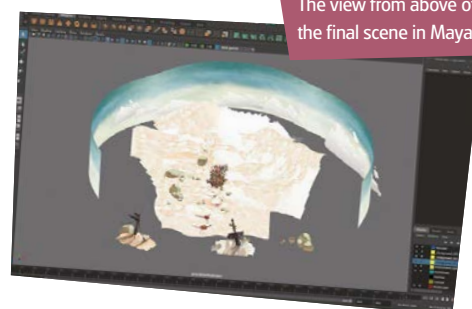
### DOING IT RIGHT

This is how the scene looks through the main camera in Maya.



### MOVIE MAGIC

The view from above of the final scene in Maya.



“The amount of work I put into each of the assets means that I now have a library of cool characters and props”

➡ This may not be noticed by the audience, but it helps me as a creator to inject a sense of meaning and history into the scene in the hopes that it will resonate.”

Rendering, says Emilie, was “a simple task” because all the information was stored in the textures and so much of the hard work was already done and ready to use.

Emilie explains: “All of my materials were surface shaders and there were no lights in the scene whatsoever. I split the scene into the appropriate render layers and rendered everything using Maya Hardware 2.0. Furthermore, I had a limited amount of render layers and only a few elements to tweak in compositing, so I quickly assembled everything in After Effects.”

Once in After Effects, Emilie applied the scene's more subtle effects, including the flags blowing in the wind and the dust in front of the turtle. She then rendered out to Premiere and for the still images, she used Photoshop to put the finishing touches to the final images.

In the end, the cumulation of all of Emilie's hours of hard work meant that she had much more than a single product to showcase: “The amount of work I put into each and every one of the assets, means that I am left with a substantial library of cool 3D characters and props. Furthermore, I decided to create the back of the piece as well, which means that the whole thing can now be used both for still images, turntables, videos and even in real time,” Emilie explains. ●



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# DISNEY'S 12 PRINCIPLES OF ANIMATION

Whether you're animating by hand or in 3D, the fundamentals of animation were in place long before 3D rendering itself became possible, as **Steve Lambert** explains







#### PRINCIPLES

- 1 Squash and stretch
- 2 Anticipation
- 3 Staging
- 4 Straight-ahead and pose-to-pose
- 5 Follow-through and overlapping action
- 6 Slow in, slow out
- 7 Arcs
- 8 Secondary action
- 9 Timing
- 10 Exaggeration
- 11 Solid design
- 12 Appeal



#### Artist PROFILE

**Steve Lambert**  
COUNTRY: New Zealand



Steve Lambert has worked in the CG industry since 2001. Currently director of animation at Weta Workshop in New Zealand, his feature film work includes Prince Caspian and Avatar. [scoobasteve.co.nz](http://scoobasteve.co.nz)

**Get your resources**  
Video files are on  
FileSilo (page 144)



## Tutorial credits

These tutorials use the "Andy" rig created by John Doublestein for the Savannah College of Art and Design  
[tinyurl.com/andyrig](http://tinyurl.com/andyrig)



# 1

## THE BIG STRETCH

It's not just bouncing rubber balls that should exhibit the first of Disney's 12 principles of animation, **squash-and-stretch**

**B**ack in 1981, Frank Thomas and Ollie Johnston – two of Disney's "Nine Old Men" – published *The Illusion of Life*, a landmark book that set out in print the 12 principles of animation that have guided the company's animators since the 1930s. Over the next several pages, I'm going to show you how to apply these classic animation principles to your 3D animation work.

It's important to note that these principles do not stand in isolation from each other. All combine to create a successful animation – but just as in a toolbox, not every job requires every tool. Note, also, that I will hesitate to refer to anything as "wrong" or "incorrect". They're principles, not rules!

The first principle is squash and stretch. The caramel-covered marshmallow of the animation chocolate box, this is the animator's attempt to mimic the way objects deform in motion. It is about so much more than the bouncing balls often used to demonstrate it: it can be used to convey weight, accentuate movement and enhance a character's flexibility. It isn't just for cartoony animation, either.

One thing to bear in mind when squash-and-stretching is the need to maintain a constant volume. If you animate an arm stretching, the thickness of the limb should decrease. Think of a rubber band: if you pull the ends, the rubber is

distributed along a greater distance, so the band thins out. The same is true if you're squashing an object: the mass has to go somewhere, and it generally bulges outward – keeping the volume, if not the shape, constant.

To illustrate this, I've put together a few example animations, which are in your resources. The Andy01 clip shows Andy, our character for this series, running from a billiard ball with no squash and stretch. In Andy02, I've applied squash and stretch to both Andy and the ball. You can see how the stretching of Andy's body as he falls and the compression as he hits the ground add a bit of punch to the animation, emphasising his weight and movement.

In this example, however, the ball no longer seems right. The squishiness kills the impression that it is a hard, rigid object. Replace the texture to make the ball a basketball, though (Andy03), and the result is much more believable.

The second example is a basic facial animation. Take01 has no squash and stretch. In Take02, I've distorted the features to elongate the expression. This drags the face along the path of movement and enhances the motion. Take03 goes one step further, changing the shape of the entire head as it moves. I've intentionally made the result over-the-top, but this sort of thing can be done more subtly to great effect.



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## 2

## THE NEXT MOVE

Wait for it, wait for it... the use of the second principle, **anticipation**, can build drama into the simplest of actions

**T**he second classic principle, anticipation, is all about broadcasting thought, communicating intent and directing focus. Anticipation can be used to prepare the viewer for an action about to be performed. There are many obvious examples, such as a pitcher winding up to throw a ball, or a bow being pulled back to fire an arrow. It is the reverse action of the one about to follow.

Anticipation is not limited to the character performing the action, though. One can direct attention to another action or object – for example, a look or gesture (possibly pointing off-screen) will direct us to something happening out of our focus area, or even indicate to us to an object that the character might be about to pick up.

Anticipation can also imply thought, because it shows that the character intends to do something and is not just moving from one position to another. Most actions have some sense of anticipation (with the possible exception of mechanised movement, although if you're animating it you should add some!), and the bigger or more dramatic the action, the bigger the anticipation. But it can also be very subtle, like the weight shift from one leg to another before starting a walk or the intake of breath before a sigh.

I've made a few examples to illustrate the above. In the first clip (Anticipation\_01.mov), I've used little to no anticipation on either character – so that when the first one runs off, it comes as a surprise and the viewer's attention may or may not be in the right place, meaning that they possibly miss the first part of the action. This can make for jarring viewing and confuse the narrative.

In the second clip (Anticipation\_02.mov), I've applied a degree of anticipation to both the characters. You focus on the boy as he pulls back before leaning in; then your attention is pulled to the girl before she runs off. It's not much, but it's enough to prepare you for their manoeuvres.

In the third and final clip (Anticipation\_03.mov), I've exaggerated the anticipation to really wind up the run. This is also an example of a "surprise" anticipation, where the anticipation might imply that one thing is about to happen but another actually takes place. In this case, the viewer might think she's leaning in to respond to the boy, but this movement is then used to reverse her direction.

As with any of these guidelines, anticipation can easily be overdone, and you should experiment until you achieve the timing that works best. And remember the unwritten 13th principle: these principles are all just tools, not rules!



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## 3

# REVEALING DETAIL

The principle of **staging** is something of a catch-all word for a large number of ideas, all of which are important

**S**taging includes composition, lighting, cameras, scene content, action, personality and mood.

Ultimately, it all boils down to one thing: the readability and clear communication of an idea, regardless of what the medium is. As director Brad Bird once put it, “Staging is staging, whether it be for animation or live action or computer films or a wedding photo.”

So staging is really everything – the entire image, what it communicates to you, and also the areas within the image that you want to direct attention to.

No one aspect of staging is more important than the others: they all work together. However, there are some that relate more directly to the mechanics that make animation work, and the one I’ll focus on here is the silhouette.

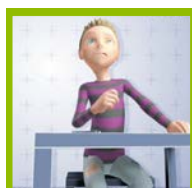
The concept originates from some of the very earliest animations, such as Lotte Reiniger’s *The Adventures of Prince Achmed*. In silhouette animation, the action had to be clear and easy to follow, or it would become unreadable and confusing. While these days there are no limits to the colour and form you can create in animation, keeping the silhouette readable still makes for much clearer action. This includes the relationships of objects to everything else in the scene, so you’ll need to consider the forms in the

background of the shot, and ask yourself if they interfere with the action and make it less easy to understand.

When you check the silhouette of your work it will quickly become obvious if the action is coming across well. If there are important actions that are indiscernible, it’s a sure sign that you need to think about recomposing the shot or modifying the action to suit the current angle better.

The first example I’ve made illustrates this point. Take a look at the *Staging\_01* movie and see if you can tell what our character is doing. Now take a look at the rendered form, *Staging\_02*. While you might be able to work out what’s happening, there are certain aspects that are unclear – such as the actions of the right hand. Composing these movements inside the silhouette conceals the actions.

Now compare them with *Staging\_03* and *Staging\_04*. Being able to see the pencil extend from the nose helps the joke make sense, and the small movements of the right arm aren’t lost within the form of the body. As the amount of action and complexity in a shot intensifies, this concept of readability becomes increasingly important. Animation takes a lot of work, so you don’t want to be wasting energy on things that are completely lost on the viewer. Make every detail, frame and scene count towards telling your story.



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## 4

# ANiMATiON OPTiONS

“Straight-ahead” and “pose-to-pose” are competing approaches to animation, but both have pros and cons

**T**here are two methodologies you can use to create animation. The first, “straight-ahead”, is where you start at your first frame and animate forwards through time one frame at a time until you get to the end of your shot. Straight-ahead offers spontaneity that can create fluid, fresh animations, which can be full of surprises. In some media, such as paint on glass, mixed media or stop-motion, straight-ahead is more or less the only way to go.

There are several weaknesses to this approach: things can begin to wander; it can be hard to clean up or tweak; and you can miss timed marks. It can be a bit like when you were a kid and wrote a big title across the page, ran out of room for the last letters, and squashed them in at the end.

The alternative is called “pose-to-pose”. Here you create important key frames (sometimes called “extremes”) that describe the whole action, then go back and create the frames between those key poses to fill out the action. Pose-to-pose is great for achieving well-timed animation: you can get a sense for how your shot is coming together and make sure characters are where they should be at the right times.

However, pose-to-pose also has its disadvantages. It can often come across as staged, and you’re less likely to come up with happy accidents along the way.

The most obvious way around the respective cons of these two methods is a “combo” approach, combining the spontaneity and freshness of straight-ahead with the planning and timing strengths of pose-to-pose. You could block out your key poses first, then use them as goalposts or marks to hit as you animate straight ahead “through” them. Or you might do a rough straight-ahead run and see where it takes you, then go back, select poses from that run, and rework and re-time them. Straight-ahead also works beautifully on secondary motion such as cloth or floppy ears. Once your character is moving the way you want, you might do another straight-ahead pass to put in extra dynamic motion. My videos show how this can work.

In P2PSA\_01.mov, I went straight-ahead on 5s (putting a key frame on every 5th frame) and blocked out my scene. I wasn’t sure how it was going to play out until I’d done this. Next, in P2PSA\_02.mov, I went back over the sequence and re-spaced my key frames for better timing. Then I started back at the beginning and animated straight through over the top. Finally, in P2PSA\_03.mov, I went back, made any timing adjustments where necessary, and did a pass of straight-ahead on the ponytail and boxes. Remember, there isn’t any formula or one “right” way to create animation! ➡



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## 5

# POETRY iN MOTiON

Follow-through and overlapping action can help make motion in your animation look fluid, convincing and natural

**M**otion in the real world is affected by momentum and inertia, and this is what follow-through is all about. When kicking a ball, for example, the foot's swing doesn't stop the instant it strikes the ball: it continues in an arc. When a car stops abruptly, the passengers inside it are thrown forward. If it changes direction sharply, they will continue on their original course for a while; this course and the change of direction become overlapping actions.

Broadly speaking, the objects affected may be active or passive. The passive group is anything driven by adhesion, constraint or influence from an initiator, such as hair attached to the scalp or clothes wrapped around the body. These must follow the movements of their initiating force, but react to momentum, gravity and atmosphere. Those in the active group have some control over their motion. They include arms, legs and tails – objects that can be passive but also have the ability to behave in more controlled ways.

How much you exaggerate the effects of momentum will vary with an object's weight and environment. Underwater, for example, passive objects waft about in a different manner from on land. A common mistake is making things look like they're underwater when they're not! This results in a wafty, rubbery animation that lacks solidity.

I've used three clips featuring Andy and a couple of props to demonstrate the principle. In *Overlap\_01.mov*, he starts walking with all of his body moving at once. His arms and legs are exactly in time. His bucket and fishing rod are stiff and wooden, with no sense of weight or flexibility. He stops abruptly, bringing everything to a halt at once.

In *Overlap\_02.mov*, I've focused on his body movements. When he starts to walk, his body leads with his hips, and his looser limbs fall behind slightly. His elbows lag behind his shoulders, wrists behind his elbows. By overlapping the rotations of his arms and offsetting them from the movement of his legs, I've made him much more flexible. The same goes for the rest of his body: his head has a sense of weight as it rolls about slightly behind the shoulders. When he stops, his body stops in stages. The amount of exaggeration determines the emphasis of his halt.

In *Overlap\_03.mov*, I've added the secondary movements of his bucket and fishing rod. Because the "joints" in the rod bend with overlapping rotations, you get the sense that the shaft is highly flexible. The bucket now feels like it's loose and light, and the fish is at the mercy of gravity and inertia – especially when Andy stops suddenly. These actions are vital to keeping your animation fluid.



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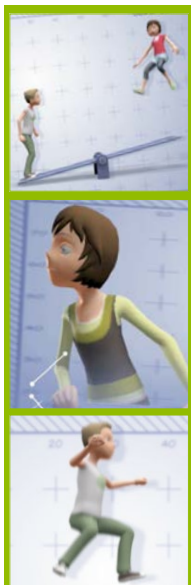




## 6

# PERFECT TiMiNG

Slow in/slow out, easing, cushioning – call it what you like, it's a useful way to make movement more realistic



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**T**hings almost never move at a constant rate: inertia, gravity, atmosphere, constraint and a range of other factors make sure of that. When something starts to move, it will usually build up energy and speed – it won't instantaneously achieve a terminal velocity. The same is true when it comes to a stop: the built-up energy needs time to disperse before coming to a halt.

Slow in and slow out – also known as “ease in / ease out” or “cushioning” – are how you represent this phenomenon in animation. They deal with the way you enter and exit key poses (as opposed to key frames). Spacing your in-betweens or modifying your curves can produce this acceleration and deceleration. More in-betweens or a flatter curve means a slower motion, fewer frames or a steeper curve a faster one.

In 3D animation, you have the invaluable tool of a curve editor. But people often rely too much on the computer to control these curves – as if the software knows what you're trying to animate! You need to get stuck into the curve editor and take control. Even then, it might be necessary to animate frame-by-frame to get the exact result you're after.

In SlowInOut00.mov, I've shown four versions of the same movement. Each has the same overall timing; all I've changed is the spacing leading into a key pose, either by

modifying the curves in the Graph Editor or by shifting the in-betweens. Scrub through the clip to observe the differences. You get a different attitude from the character each time, even though they're identical in substance.

The next three clips are all based on a single five-second sequence. All three have the same timing; all I've changed is the entry or exit from each key pose. In SlowInOut01.mov, the action is completely linear. The movement is lifeless, and the characters have no real weight – they just launch off the ground.

SlowInOut02.mov looks much better. Easing out of the crouch injects effort into their jumps as they overcome gravity. We slow into the peak of a jump and slow out of the peak as inertia fades and gravity takes over. However, the characters are slowing into their landing positions. This makes the landings a bit soft, so it's better to change the landings to a “fast in”, as shown in SlowInOut03.mov. This has two effects: more “hang time” for the characters, and real punch to the landings. The absorption of the landing energy is reflected in the bending of the see-saw. So, slow in and slow out add much more than just realism. Choosing where to use them – and where not to use them – can make actions much more nuanced, individual and subtle.







## 7

# FEEL THE FLOW

Want to know the secret to capturing the sweeping movements of natural forms? It's all about the **arcs**

**i**n nature, everything moves in arcs. Limbs pivot and rotate around joints; projectiles fall to the floor in a graceful arc as gravity takes effect. Even more importantly, arcs are gestures or lines of action; if straight lines give your animation power and emphasis, arcs are what give your animation consistency and flow.

Staging (see page 50) is important here: because the final rendered frame lies on a 2D plane, lines of action should be clear from the camera viewpoint, not formed in 3D space.

There are several ways to visualise arcs as you work. You could sketch thumbnails of your sequence out first (a good idea anyway) and draw your arcs in. You could sketch your curves with a curve tool – in Maya I mostly use Animation menu set > Animate > Create Motion Trail (with Draw style set to Line in the options). It gives you a constantly updating line, so you can see your arcs as they take shape.

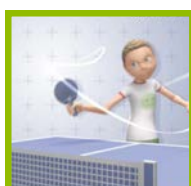
It's been said that computers make this principle hard to apply, but I disagree. The nature of joints in 3D means that arcs are as inevitable and natural as they are in the real world – as opposed to the lack of a physical skeleton in 2D animation, for example. You still have to control gestural arcs, but the danger of limbs growing and shrinking mid-shot is pretty slim.

A big exception is if you use IK to control movements: you have to be careful of how your arcs are forming, and they generally require more keyframes to achieve the desired results. In my example videos, I've specifically used IK for the main "action" arm to help illustrate the idea. The main point I'm tracing is the tip of the ping pong paddle.

Arcs\_01.mov shows most of the action in place. If you look at the arcs in Arcs\_02.mov, though, the lines are messy and the flow from one swing to another is broken. Because the IK handle is basically moving in world space, it doesn't inherit any motions or arcs of the body. You need to add all of that in, as well as forming the action to suit the camera.

Arcs\_03.mov and Arcs\_04.mov show the result. The arcs are much smoother; not only do they stop the arm slicing through the torso, but the readability of the action is much better. This is especially important with action that comes towards the camera.

Arcs aren't limited to large limb movements. Subtle movements are just as important – the rolling motion of the hips, the rise and fall of the head in a walk, the sweep of a head turning... even the movement of eyes. Arcs add clarity to your action, and make a drastic difference to the quality and appeal of your animation.



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## 8

# SUPPORTiNG ACTS

**Secondary action** consists of those little details that really bring out the personalities of your characters

**S**econdary action or secondary animation is all about adding depth and substance. This is where your attention to detail can separate interesting from dull, and delightful from mediocre. Secondary action doesn't need to be obvious; it can be very subtle, building layer upon layer to enrich the main action. However, it shouldn't become focal unless it's meant to become part of the primary action. Otherwise it's just distracting.

Secondary action falls into two rough groups. The first is motion derived from primary actions. This means your usual suspects – loose hair, clothing, skin and so on – but also any object that is driven by another force. When a basketball hits the backboard, for example, the rim vibrates, the net shakes and the backboard rocks. These motions are secondary to the primary action of the basketball's bounce and add emphasis and realism to the shot.

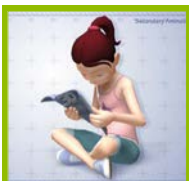
The second group consists of performances or actions that are secondary to the main idea of the shot. Say you have a baby squealing and reaching up for a hug. Adding in toes or fingers wiggling is additive (secondary) to the main idea that the baby wants a hug. Even the face can become secondary if the body language conveys the point in an unsupported way (if our view starts from behind, say).

In the example included, I've shown three differing approaches to secondary motion across three clips. In the first clip, the character is reading a particularly noteworthy publication. This is the primary action: the character is absorbed in reading and turns the page.

The second pass is where I add some more depth to what is happening. How do you make watching someone reading more interesting? It's about adding the subtleties, the little quirks that make an individual. First, I add obvious details such as flexibility to the magazine and its pages, making it respond to her movements. Then I add some movement to her ponytail, so that it's not a solid lump sticking out the back of her skull. Then I add some subtle facial animation, just enough of it to show her captivation in her magazine.

The third pass adds one more important layer: having her lock of hair hang down and then be brushed back. It helps reinforce her absorption in reading and adds a level of cuteness to her character. You can see how a detail like this might carry over to any other scene she would be in.

You could argue that this is really part of the primary action, but adding it doesn't change the focus of the shot – it's just a peripheral action. Remember, the best secondary actions work best when they seem completely natural.



### Watch the videos

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## 9

# PICK YOUR MOMENT

**Timing** – the pacing of your animation – controls how it is perceived, and might be its most crucial aspect

**T**iming really is everything. You can have the perfect amount of squash and stretch, the most beautiful staging and the curviest arcs, but if your timing is off, it can make everything fall flat. 3D animation has a huge advantage here in that timing is easy to massage, unlike in traditional 2D and stop-motion animation, where your timing needs to be perfect from the start.

Timing may be physical or theatrical. Physical timing is exactly what it sounds like: reflecting how objects behave in the physical world of gravity, weight and mass. This isn't to say that actions must be pinpoint accurate, but they should at least be contextually believable and not jarring. Objects should behave as the viewer expects, more or less.

Theatrical timing relates to acting and performance: how long an action takes, or how long you hold a pose. For example, a character walking slowly might be doing so because they're old, injured, unhappy or just plain huge... Changes in pacing can make drastic differences to the mood of a scene or the viewer's interpretation of what's happening.

In the video examples, I've illustrated both these aspects of timing purely by changing the pacing and nothing else. In the first clip (mov1), our hero is marauding his way through a city causing havoc. The speed of his movements

and the physics of the props imply the scale of the scene – in this case, toy cars and cardboard buildings.

What I'm after is a more dramatic scale: a giant boy in a life-sized city. If he's that much more massive, he'll need more effort to overcome gravity, and he will slow down somewhat in doing so. This isn't just a case of scaling out all the keys and slowmo-ing the piece. It's about reinterpreting the speed of his movements to suit the weight being shifted and the greater distance being travelled.

These changes are mostly related to the physical timing of the piece (although there are often crossovers), but there are a couple of moments of purely theatrical timing that need tweaking as well. The holds around frames 75 and 120 (mov01) are too short to convey the mental processing that's going on in his head. I want these to read more clearly, so I add some frames to pad out their length. In mov03 I added some camera shake, to help sell the sense of scale.

Timing gives meaning to movement. Small changes in the pacing or your keys can make a world of difference to the sense and impact of a scene, even without modifying a single pose. Observe movement around you and even analyse filmed footage frame by frame to develop your understanding and interpretation of timing.



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## 10

# LARGER THAN LiFE

**Exaggeration** doesn't mean going over the top with your actions – it's about pushing everything to complete clarity

**E**xaggeration is the most essential principle you will ever, ever learn. It's less a tool in itself than the degree to which you apply all the other principles of animation: the amount of squash-and-stretch you use, the length of your holds, the curviness of your arcs, the distance of your follow-through... Exaggeration is not simply "pushing everything to extremes," it is more a matter of purity or single-mindedness. It's all about enhancing the essence of your idea or action. If your idea or action is wild and extreme, then knock yourself out – push everything to its limits. But in all cases, think of animation as like acting on stage: every gesture and subtlety must be clear even to viewers seated in the most distant seat in the topmost gallery. Subject to your judgement and the principle of appeal (see page 59), the guiding rule is that viewers must be able to comprehend absolutely clearly what's going on.

You could also think of exaggeration as a caricature of an action. If you look at any good caricature illustration (say the work of Roberto Parada or Daniel Adel), the recognition of the personality is usually instantaneous. Even when the artist makes extreme distortions to the face, the elements that make the person unique are intact enough or enhanced enough to make an identification. In animation, this is

much the same concept – enhancing the important aspects that help communicate the idea or action.

One reason for all this (other than the fun of it) is that animation tends to need this emphasis to convey subtleties that don't carry through very well otherwise. Even if you religiously follow reference footage, you can be left with a performance that is lacking. The Disney animators found out early on that even tracing action directly from film – creating a perfect capture of real motion – resulted in a stiff and unappealing animation. Pure 3D motion capture can produce the same effect.

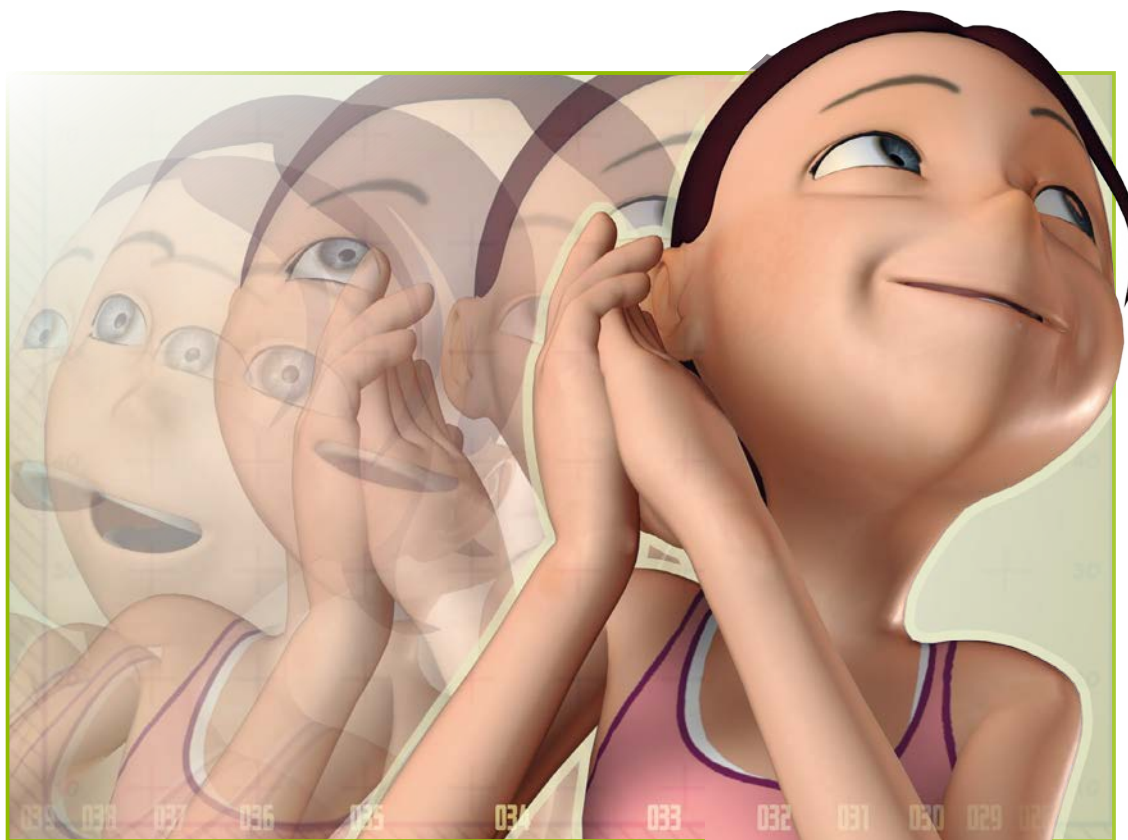
In the examples in your resources, I've started out with a plain vanilla walk cycle and taken it through several iterations of exaggeration. Even as you arrive at the last clip (where I've taken things as far as I'd want to go without losing the controls in Z-depth!), the wild motions are still recognisable as a walk.

Exaggeration is the most creative aspect of animation. If we use the illustration analogy again, think of all the other principles as your toolbox of pens, pencils, knowledge and observation. Exaggeration is the amount of stylisation and flair that you use to place your pen strokes – or, in the case of animation, your key frames.



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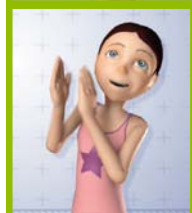
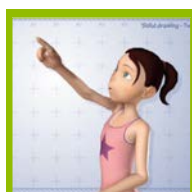




## 11

# SHAPE AND FORM

Even if shapes and actions are exaggerated, and even if you work in 3D, you need to pay attention to achieving **solid design**



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**T**he principle of solid design (or solid drawing) originally referred to making characters and objects feel three-dimensional despite existing on a two-dimensional surface. This doesn't require naturalistic or photorealistic rendering, but it means that even cartoony characters and objects must have consistent volume and mass through an entire sequence. If shapes lose their mass, change perspective or jitter, it can completely distract the viewer. Many people have the ability to draw an image with beautiful form and line, but it's much harder to do this frame after frame in a consistent and appealing manner. On the most fundamental level, a character must look like the same character even as it moves or turns. It's surprising how one flawed frame can spoil a sequence, and conversely how fixing a single frame can help the flow of motion.

You might think that 3D animation will take care of the basics of solid design for you, but although 3D eases the struggle to render beautiful drawings for every frame of animation, you still need to understand how shadows act as cues to the solidity of objects, how a feeling of mass can be conveyed, and how living things actually move and balance.

Look at the series of poses in the first video for this part. The poses on the left are quite clearly lacking. If this were a

solid body, it would be falling over. Compare this to the poses on the right, which clearly show her centre of gravity has been shifted. The next two poses are similar, but balance isn't the only factor: the left-hand poses are quite visually unappealing. You want your poses to have interest and appeal, and this is again where the body lines come in – flowing all the way to the fingertips.

A classic symptom of poor solid design is something called "twinning", where a character's poses or actions are symmetrical in some way. This is quite unnatural and can leave your animation feeling stiff. In the second clip, I've shown some examples of twinning in motion. The most obvious example is the arms: both are not only doing the same thing at the same time, but are symmetrical in their pose and form. In the third clip, I've modified the timing and pose for the arm keyframes to fix this. The difference is dramatic, and adds greatly to the appeal. The other, less obvious (and often overlooked) area is the face, in which symmetry is an immediate flag to a viewer that something is a bit off. Real faces are never perfectly symmetrical.

Regardless of how you create your animation, your ability to render credible mass, form and balance has an enormous impact on the credibility of your illusion of life.



# 12 principles of animation



## 12

## ADDED APPEAL

The final challenge is creating **appeal** – the x-factor that gets your audience caring about your characters



**Watch the videos**  
Turn to page 144 for the link to the video for this training

**A**ppeal is about creating a character that's engaging to your audience – one that they will sit through the film until the end for. It doesn't require fluffy bunnies or cutesy lambs, and it's not about the audience "liking" the character. Even villains and demons need appeal – indeed, people often seem to be drawn to villains more than heroes. If a character lacks appeal, why would you care what happens to them? Why would you endure 90 bum-numbing minutes of unappealing story?

Good conceptual design and style have a part in appeal, but they aren't everything. Those things are often out of your hands anyway. Unless it's your own project, some director, producer or client decides what the character looks like before you get anywhere near it. The most important aspect is how you build appeal through performance.

The most interesting people to watch are those with exaggerated features or wrinkles, not flawless models. It's much the same with mannerisms: quirks and imperfections are what create interest. Like a good stand-up comedian, individual touches get you to relate to the story, making a link between your feelings and the character's.

Build a backstory, and feed it into details. Take Peter Pan's Captain Hook. One of the things that makes him appealing

is his fear of ticking clocks, because the crocodile that took his hand also swallowed a clock. Subtle, or even oblique, details can build up appeal on multiple levels – look at how Pixar's work is appreciated by both adults and kids.

My videos for this section have our hero cooking his breakfast. Clip01.mov shows that it's easy to show his basic actions and get the idea across, but it's not particularly engrossing. How can we make cooking hold someone's interest? Clip02.mov adds a few details: the extra tap on the egg, the flourish that he uses to add the egg to the frying pan – but more importantly, wiping his hand on his T-shirt. These details are character imperfections we can relate to.

Appeal is also the sum of your animation's parts. Look back through the principles we've covered, and make every aspect of the animation express your character's quirks and subtleties. Is your squash-and-stretch enhancing their performance or confusing it? Are there relevant secondary actions you could add to reveal personality? Do you have solid poses and nice arcs? Do you have enough frames to do what you're trying to do, or is it too much too quick? And is the scene staged well so that all this hard work isn't lost on anyone? If you have all your ducks in a row, it's a good start to having an appealing and successful animation. ●

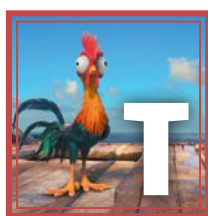






## MAKING OF MOANA

**Barbara Robertson** discovers how Disney Animation created this beautiful CG film



he heroine of this Disney animated feature is a teenage princess named Moana, who tries to save the mysteriously land-

locked people of her stunning South Pacific island by sailing into uncharted waters. The story might have turned out quite differently had directors Ron Clements and John Musker not taken their own journey to the islands of Polynesia.

One of the legends they discovered was that after sailing for 3,000 years, the Polynesian voyagers had stopped sailing for 1,000 years.

This long gap in exploration sparked the story that then became Moana.

"The big turning point was learning about the emphasis on navigation," explains Ron, "and that right now in the South Pacific, there is a feeling that their [the islanders'] identity may be lost."

Together, directors Ron Clements and John Musker have created classic features *The Little Mermaid*, *Aladdin*, *Hercules*, and *The Princess and the Frog*. Moana is their first all-CG film.

"John Lasseter [chief creative officer of Pixar Animation Studios, Walt Disney Animation Studios, and DisneyToon Studios] felt strongly [Moana] would be CG, but I wasn't clear that was the best way," says John ➤➤



## DISNEY STYLE

Maui is an adventure seeking 'god', a character the animation team needed to focus on in his design.



## CUTE PIGGY

Moana's precious pet pig Pua is a typically cute Disney sidekick for the heroine.

## “ I think one of the things that wows people on this film is seeing naturalistic hair and clothing movement ”

➤ Musker. “I felt it might be hand drawn. But when we were in the islands, I asked people to point us to painters and drafters for inspiration. An artist on Samoa told us there is no indigenous painting culture in the islands. They did sculpture,” he explains.

“And, we wanted to make a living ocean,” adds Ron. “The character of a hand-drawn ocean wouldn’t have looked as good as what we wound up doing in CG.” Even so, art director of characters Bill Schwab and his team began discovering Moana’s look through drawings before handing her to the character team. Visual development artist Neysa Bové worked on costume, jewellery design and hairstyles. The character team: Bill; animation supervisor Malcon Pierce; rigging supervisor

Mike Navarro; and modelling supervisor Chad Stubblefield brought Moana into CG.

“Drawing is how we communicate between departments,” explains Malcon. “We did markup passes to define shapes for her hair and cloth. When we first got Moana’s facial structure, we had drawings for every expression. We tried to hit those expressions, and then did markups from different angles to improve on the shapes and make sure she could breathe in the world. Before this, I didn’t realise posing lashes made such a difference in expressions,” he adds.

Bill stayed with the team through the entire production to help the 90 animators on teams led by co-heads of animation Amy Smeed and Hyrum Osmond.

“Even during shot production, people would send me shots saying, ‘Moana doesn’t feel right, can you help me push this pose?’” Bill explains. “This is the first time I’ve done that, even though I had the same role for Frozen. But I’ve worked with a lot of the animation supervisors, modellers, and riggers for 10 years now. We’ve built trust,” he adds.

## Making Maui

The challenge for Moana was in keeping the teenager heroine, full of determination, as well as true to her heritage.

“When we’re thinking about a character, a walk is usually the best place to start,” Malcon says. “We find out if her arms are too long or too short. If she points her toes. Then, we have her run and test the simulation on her hair and clothes. We start rough and then refine and refine. Sometimes a pose can take three hours, and we have 24 poses per second.”

For Maui, the character team looked at professional wrestlers and body builders, men



## FIRE AND WATER

New tools and techniques lessened the load for effects artists, and at the same time gave layout artists and animators more control

During Moana's journey, the young adventurer encounters a living volcano, the Lava Witch.

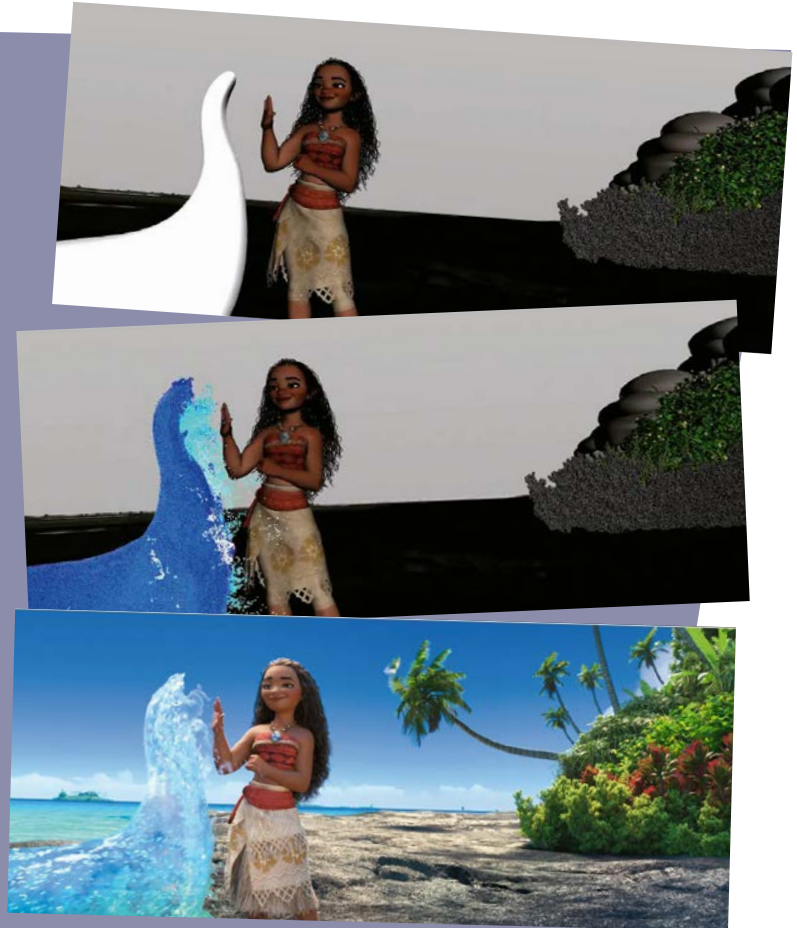
"I can't ever remember a character being that challenging," says co-head of animation Amy Smeed, talking about the fiery lava monster. "We did the character performance with her. Then effects added the lava. If we had too much lava, it distracted from the performance."

Thus, artists from the effects department always participated in lava monster animation dailies. "There was a lot of collaboration," Amy says. "They might say that if she stays this speed, the lava will go crazy. And we might say, 'But we need her at this speed to sell the acting.'"

A technique called 'foundation effects' helped. Effects artists would build a library of fully realised, ready to render smoke plumes and lava splashes flowing from the Lava Witch into the water that layout artists and character animators could place in a scene.

Layout artists and animators also used foundation effects for water splashes and spouts. "Foundation effects gave animators and layout artists timing control over the splashes, the water spouts, the bursts of lava," says visual effects supervisor Kyle Odermatt.

The visual effects artists created the data sets that become foundation effects primarily in Houdini, but custom tools made it possible for the data sets to travel throughout the animation pipeline. In addition, a new Splash tool created for



this film enabled the team to put Moana and Maui on and in the Pacific Ocean and even, at times, interact with the water in unique ways. As the water is in itself a character, it needed to be able to interact with the other characters.

with muscle mass. "He doesn't wear a lot of clothing, so we had to deal with anatomy more than in other films," says animation supervisor for Maui, Mack Kablan. "We pushed his proportions to convey power and charm. He's a few thousand years old and an adored demigod. So, he's pretty laid back. When he sits, he lets gravity do the work. But when he's called to action, he flips a switch and goes from sitting to sprinting in a few frames."

The biggest challenge for the Maui character team was in keeping the demigod's essence during and after his shape-shifting transformations into, at various times, a hawk, lizard, beetle and a whale.

When he's a hawk, he flaps his wings slowly and powerfully, and when he lands, he again lets gravity do the work. "Early in production, we had a meeting to decide how we would make the transformation look right," Hyrum says. "We decided that any time Maui moves from one form to the next, there will be big anticipation and then action will pull him

from one form into the other. We almost didn't need lighting and effects to go from animal to animal."

As for Maui's tattoos, the inked drawings represent his accomplishments, and within them is an animated caricature of Maui. This meant animating 2D drawings on a 3D character's body. For this, the Moana team turned to multiple Annie Awards-winning animator Eric Goldberg.

"The small tattooed version of Maui became known as 'Mini Maui'," says Eric. "He has personality and function in the story. Maui is a trickster but when he goes too far, Mini Maui pulls him back."

### Creating realistic hair

Maui was originally bald, but after the team consulted with the Oceanic Trust, they decided to give the character a full head of coiled hair. "We knew we had to do something different," head of characters and technical animation, Carlos Cabral, explains. "He'd have wet hair,

dry hair, and wind was so important in this world we created," he adds.

Moana always had long hair and took cues from actress Auli'i Cravalho, who plays with her long hair. The interaction between CG hair and CG hands is always a challenge.

A new grooming system called Tonic was used. This was created for Frozen, evolved for Big Hero 6 and changed again for Moana; the hierarchical grooms from Tonic became rigs for posing and simulation.

The new system, Quicksilver, lets artists pose and animate the hair directly. "It's very significant," says visual effects supervisor, Kyle Odermatt. "With this system, we can take simulation down to the strands. I think one of the things that wows people on this film is seeing naturalistic hair and the movement of clothing."

Although much of the film takes place on the water, the film begins with Moana on her island, Motunui. The island is not real; it's an art-directed amalgam of various South



## MAKING A SCENE

Taking a broad look at how a scene is created at a major animation studio can help you understand the roles involved and where you fit in

It's often worth taking note of the entire process that goes into creating a CG animated scene to understand the different roles.

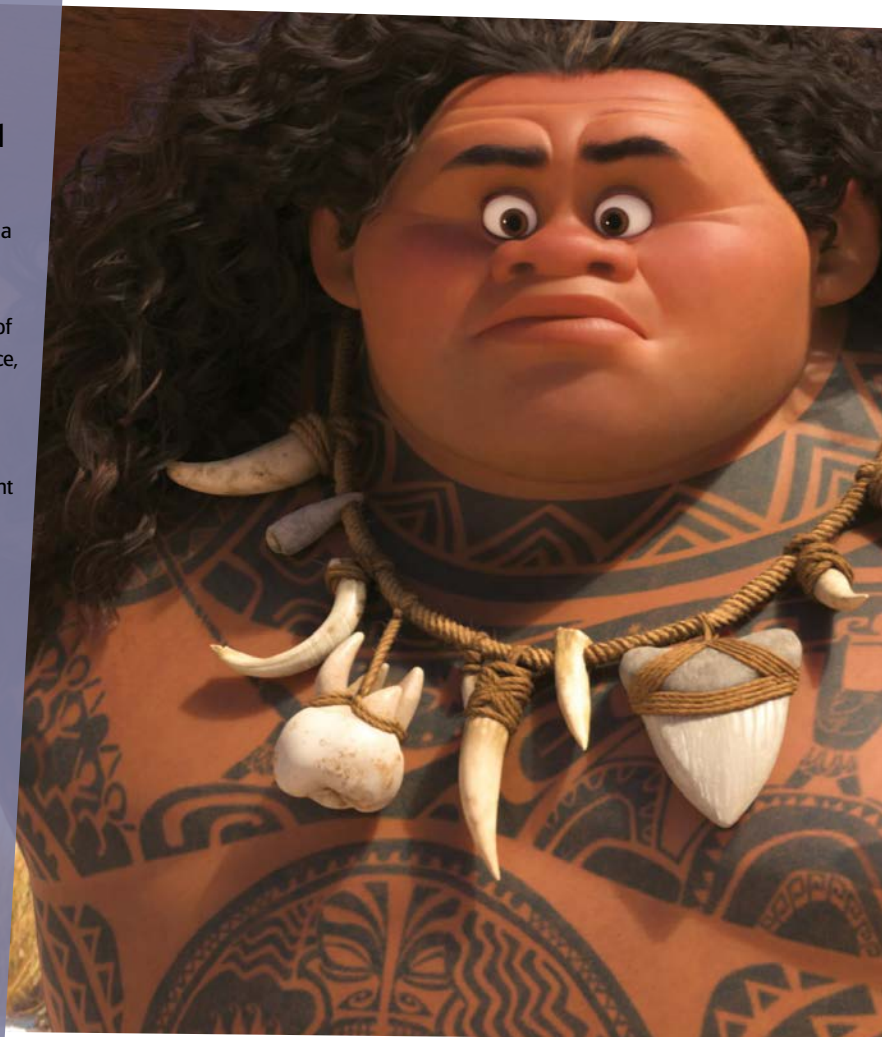
Every shot starts at the same point, with storyboards (top image). These are drawn by story artists and are the first visual representation of the film's story anyone will see. They are placed side by side in sequence, so that they convey scenes and deliver a rough sense of how the story unfolds. It's here that the beats of the film are set.

The pre-visualisation phase in the CG animation pipeline, known as Layout, allows artists to place cameras and characters in an environment to block out shots in a three-dimensional space. The layout pass is based on the storyboards and precedes character animation.

Using the blocking established in the layout phase, character animators begin to bring characters to life by physically posing them, frame by frame, in the CG environment (middle image). It's here that CG animators can get a feel for the characters and really start to bring a performance to the screen.

The next step is to send the scene to the technical animation artists to focus on bringing art direction into simulated physics generated by the simulation team – TechAnim affects how complex elements like hair and clothing behave when subjected to collision, gravity and wind, which are generated by simulation.

The lighting department is responsible for integrating all of the elements into a final scene (main image). The lighting is achieved by placing virtual light sources into the scene to illuminate the characters and the set for final viewing and editing.



➡ Pacific islands. Production designer Ian Gooding, who came onto the movie early and began doing what he calls 'fun, blue-sky concept art', was particularly keen to travel to the South Pacific to be sure his designs didn't look like Jamaica, his home country.

"The geology is very different from the Caribbean," he says. "There, volcanoes explode. Here [in the South Pacific], we have pure magma building islands in layers over time. We have coral reefs. We wanted to make sure our trees were specific to that part of the world. We watched how the shadows move on the sand, which is one of the things that influences your feeling of being there."

The team photographed several islands, mapped a mountain in Morea, and spent time on Teti'aroa. "Teti'aroa isn't as heavily travelled," says Ian. "It only had what was native or brought to the island 2000 years ago. We took close up pictures of trees, bark, and so forth." Even after all that, Ian felt that his ideas for Moana's island still weren't working. "I had developed a shape language with triangles, but

“ We knew this would be the most beautiful movie ever animated. It's visually like nothing before ”

it didn't feel truthful to the world," he says. "So I brought Andy Harkness on. Andy let the environment dictate."

Andy, art director for environments and colour, combed through all the photos Ian had taken and began drawing over them. "I wanted to see what shapes formed from the lava, the way it cooled," he says. "Everything has strength but a soft edge. Plants look almost manicured by the wind but the side the wind doesn't hit is wilder. Then I worked on scale and proportions. The islands seem massive when you're there, but when you take a picture, everything flattens."

The houses on the island look hand hewn, while the colours of the world are saturated, especially the water, which is a stunning mix of blue shades. "On Morea, the water was

almost fluorescent," says Andy. "It's a colour we never see in California."

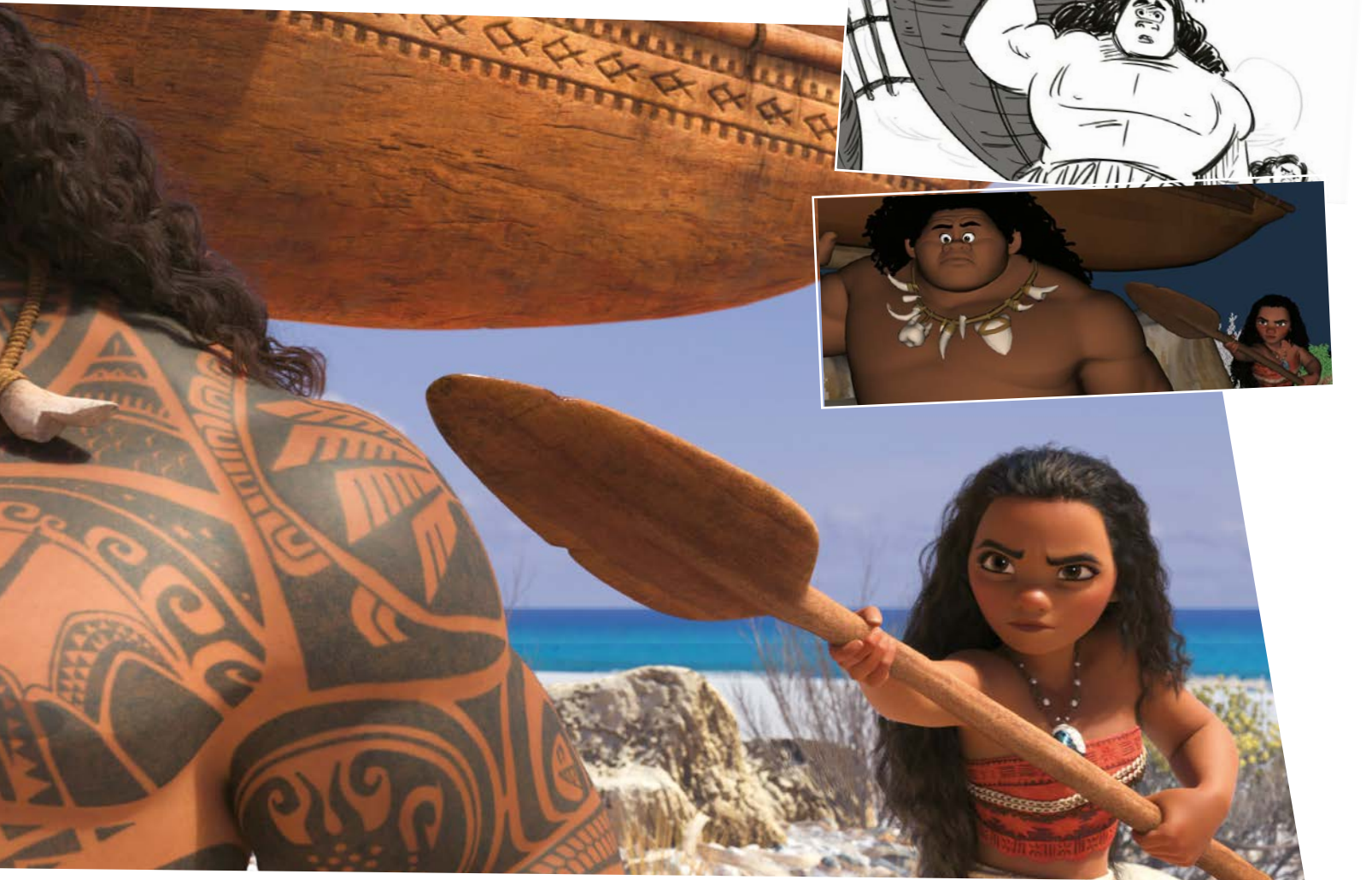
### Oceanic environment

"One thing that worried me was how would we create 'wow moments'," Ian admits. "For much of the film all we have is horizon with sky and boat and water."

The answer was in the details. The modellers and texture artists created a boat so detailed that you want to reach out and touch it. The lighters turned the water into shades of blue. "Water is not monotone," says Adolph Lusinsky, director of cinematography for lighting. "There is a range of hues. We caricatured the colours because photographs can't capture them. What you remember as one colour is many shades," he adds.



# DISNEY'S MOANA



The lighting team also added caustics to create patterns in the volumes of water, but doing so meant an upgrade to Hyperion, Disney Animation's rendering software. Adolph notes that 80 per cent of the detail in the water is from the caustics.

## Blue sky thinking

As for clouds, the set extension artists often created the background skies. "We knew that The Good Dinosaur would use real volumetric clouds and I thought in my jealousy that I wanted that too," says Ian. "But when you have fluid simulation clouds, what you get is reality. It was hard to get the caricatured shapes we wanted using volumetric clouds. So, we have some, but most are painted."

With the sky occupying a large percentage of the images, and therefore the screen, the clouds, and how to treat them, became especially important to the Disney team. The colour of the sky and the clouds were carefully thought through and created to ensure that the way they looked reflected the emotional

content of the story and happening events up on the cinema screen.

"We tried to keep the clouds true to the story," says Andy, explaining: "When there are clouds there's wind, so when Moana's boat capsizes there are more clouds, and in calm morning sequences, the clouds disappear. When we needed a beautiful sky and pure blue wouldn't do, we took some license."

Live action films often take audiences to other places and times in history, but few animated films accomplish this feat. The attention to historical, cultural and physical research in Moana transports the audience into another world. And it also helped create a unique, visual animated world.

"We knew this would be the most beautiful movie ever animated," says screenwriter Jared Bush, who has also worked on Big Hero 6 and Zootopia. "We knew our story would have to measure up to the amazing visuals. There are things in the third act that Dave [Pimentael, co-head of story] boarded that will surprise people. It's visually like nothing before." ●

## SPLASHING AROUND

Disney Animation R&D developed new tools for Moana

Among the new tools created for Moana are Splash, made for simulating and art directing water, and Quicksilver for bringing hair simulation down to the strands. Tonic, developed for previous films, provided hair grooming.

"We use Maya as a primary interface," says technical supervisor Hank Driskill. "And Houdini for effects data sets, but we build so much on top, they're almost application interfaces. The tools the artists use are home grown."



# WORKSHOPS

74 pages of step-by-step guides to help you master the art techniques and theory to get ahead in animation!



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WORKSHOP  
FILES AND  
RESOURCES  
**SEE PAGE 144**





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## PHOTOSHOP

# CREATE A FIGURE FOR ANIMATION

**David Adhinarya Lojaya** gives you some simple guidelines to help you develop a character from initial sketch to a design ready to be animated

**O**utstanding, compelling characters are one of the most important aspects of an animated film. An eye-catching character – ideally several – is a must-have in every production.

Imagine watching a modern-day animation film with a boring main character. Would your time spent in the cinema be enjoyable? No, and more than likely the film wouldn't do well at the box office – and making animated films is an expensive business! That's why

character design is a key part in the pre-production process of any animated film.

But the great thing about animation, as opposed to a live-action film, is that you have more freedom when designing characters. There are a lot of techniques you can use to make your animated character appear more interesting. You can make the character stand out by their silhouette, or by their unique style, or just simply because of their cute appearance.

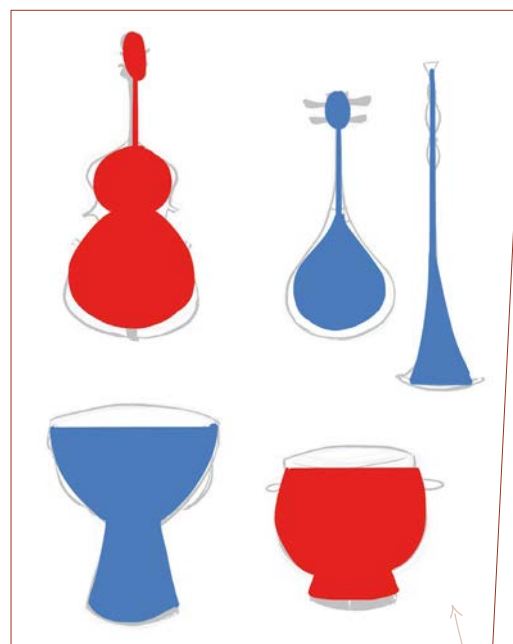
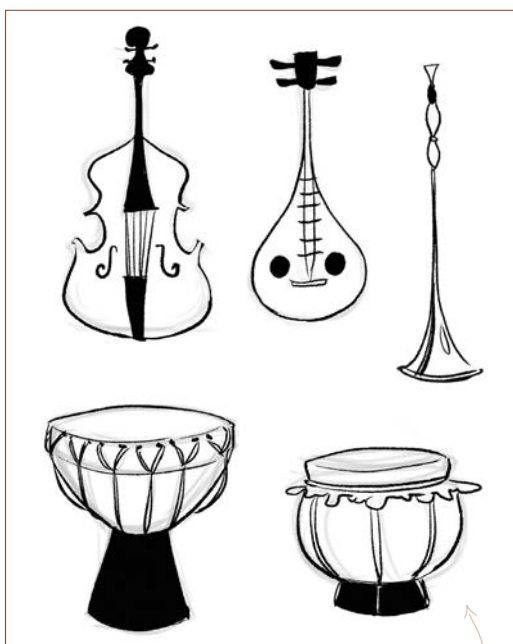
In this workshop, I'll share my process for character design and development. The workshop is divided into several simple steps, and my task is to create an original character: a male jazz musician from the 1940s.

I've decided he will have a charming, flirtatious and gentlemanly personality. Basically, he's the regular main character from a vintage musical. But how can I make this character stand out from the crowd? Read on to find out...

### PRO SECRETS

#### Customise your interface

Your interface is like an office workspace: you can rearrange it based on your specific needs. In Photoshop, go to Window > Workspace > New Workspace and set up your own interface and arrange its tools to suit the way you like to work.



### 1 Understand the client's needs

You don't usually work alone, and you need to understand what the client art director wants. Talk to them and make sure you have the same idea in mind. Once you connect with the concept, then you can start researching. Don't limit your research to your own subject – brainstorm and come up with totally different ideas and directions.

### 2 Sketching from basic shapes

I come up with something related to jazz and decide to analyse the basic shapes of some musical instruments. I pick a violin, a lute, drums and a trumpet, then convert them into their basic shapes. This will help me develop the core idea of what my character will be. ➡





*Artist*  
**PROFILE**

**David Adhinarya**  
**Lojaya**  
COUNTRY: Indonesia

 David is a  
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<http://david.lojaya.com>

 **GET YOUR  
RESOURCES**  
See page 144 now!



## Shortcuts

### Change Opacity

Number keys (PC & Mac)

With a Brush tool active, quickly change the brush's Opacity – tap 1 for 10 percent, 5 for 50 percent, etc, or 5+4 for 54 percent, say.



## RESOURCES

### WORKSHOP BRUSHES

#### PHOTOSHOP

##### CUSTOM BRUSHES: TEXTURE BRUSH



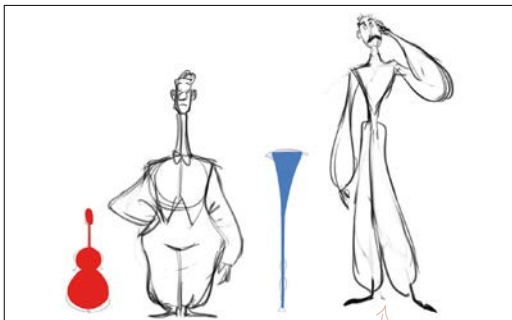
##### PORE BRUSH



##### OIL BRUSH

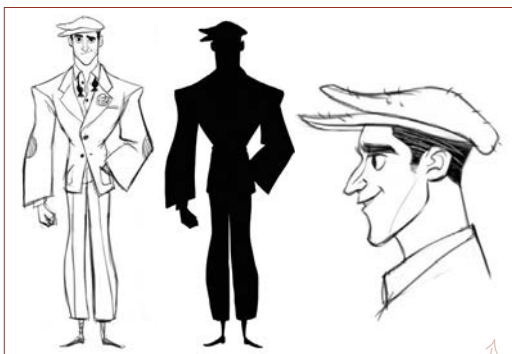


These custom brushes help me with detailing and adding textures. I usually set them to 30-50 percent Opacity, depending on my needs.



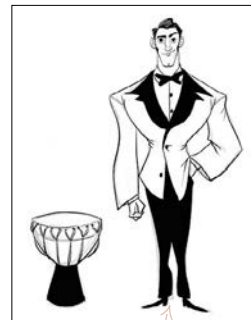
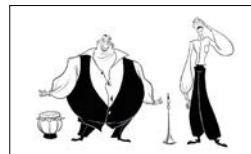
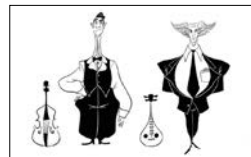
## 3 Time to exaggerate!

Now here's the fun part. With those basic shapes, I try to imagine them as if they're a character. I add some eyes, and even whole faces to them. Then I try imagining the lower part of the instrument as the character's body, too. Of course, I can always change their perspective.



## 5 An effective design approach

Sometimes a design doesn't need a reason to look good. But good design with a meaning is beautiful! It's time to evaluate the character, his design and functions. Ask yourself everything. Why is the bow tie untied? Why is his jacket blue? Always come up with logical answers – your client may ask you the same questions.



## 4 Simplify your character

I keep the character simple. It's not about textures or accessories here, more about lines and silhouettes. I decrease my character's silhouette until it looks simple, but it's important to add your own drawing style, too. Next, I come up with five characters and then I pick the one who looks the most charming. Now I can play with the face and colours.



## 6 Give life to your character

Now I'm about to add a little life to my musical friend. I draw some expressions on him, according to what I think he might look like in the film. He's a romantic fool, so I draw some funny faces. Exaggeration is one of the fundamental elements in animated film, so don't forget to use it.



## 7 Produce dynamic poses

Drawing gestures of your character helps to understand their personality. This chap's a jazz musician, so I'm drawing him with a guitar and other instruments. He's also a romantic, and a bit of a flirt. So to get this message across to my audience I need to exaggerate his body gestures and facial expressions.



## 8 Apply flat colours

After playing with gestures, I put some flat colours on the character. Flat colours help me to get a clearer idea of how he might look in the film. I experiment with a lot of different blues for his clothes, but because he's from the 1940s, I pick the one that has more of a vintage feel to it.





## 9 Choose poses to render

Now it's time to fully render my man. I usually pick a standing pose, because it tends to result in a more dynamic drawing. I also pick this full-length pose because it shows off a lot of my character's body and clothing, while I feel that his gesture shows off his personality.



## 10 A solid foundation

I paint in black-and-white at first, laying a foundation for tonal values. My approach is something like a 3D render but with a 2D feeling. I'm working in one layer here, but you can use more. I prefer to combine them into one layer because it's easier for my next step.



## 11 Apply colour to my character

After I'm done with black-and-white, I add colours on top. I create a new layer and clip it to the black-and-white layer (press Alt and move the cursor between the two layers until it changes to a lock icon, then click). I change the layer mode to Multiply and add bright colours, because using Multiply mode will dull down the colours.



## 12 Finishing details and texture

After this step I usually merge all the Multiply layers and the black-and-white layer into a single layer to work on. Don't forget to always back up your layers, though. On the single layer, I begin to paint again, adding some textures and details with a custom oil brush.



## 13 Paint more poses

Producing more paintings of a character will help my client understand my design choices. So I paint some more poses, trying to do different painting styles each time. Since he's from the 1940s, I depict him as if he's starring in a film noir.



## 14 Compiling the designs

When finishing up, I like to compile everything into a presentable portfolio. I bring everything together and pick the best from the sketches and paintings. The simplest ones are usually better, but it depends on the subject matter, too. I clean up the sketches and redraw some of the messy ones. Now my charming musician is ready to hit the silver screen! ●

### Shortcuts

#### Duplicate a layer

Ctrl+J (PC)

Cmd+J (Mac)

Use this shortcut to quickly copy the current layer (or just the current selection, if there is one).

### PRO SECRETS

#### Liquify time

Flip the image frequently, to check for flaws in your composition. Sometimes you might feel too lazy to redraw some errors. So instead use Liquify to deform it. Go to Filter > Liquify and use the Forward Warp tool to deform, and Reconstruct as needed to undo.





## ARTIST INSIGHT

# ESTABLISH CHARACTER SHEETS AND GUIDELINES

In animation character guide sheets are useful for maintaining consistency and instructing other artists, explains **Emma Vieceli**

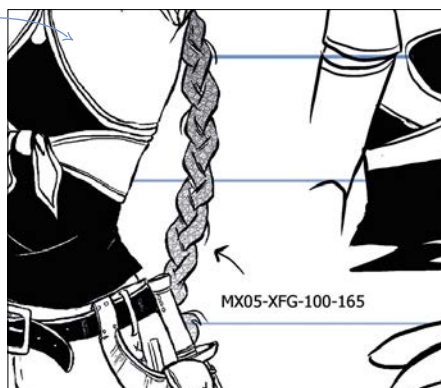
**T**here are several reasons why a character guide might come in handy. You could be assisting an animation team, leading a project that other artists will be drawing, or working on a three-book title that means drawing the same characters thousands of times. Whatever the reasons, consistency and handy checkpoints are crucial for visual, character-driven projects. Consistency will help your readers engage with

a character, and helpful notes can be referred to in moments of doubt.

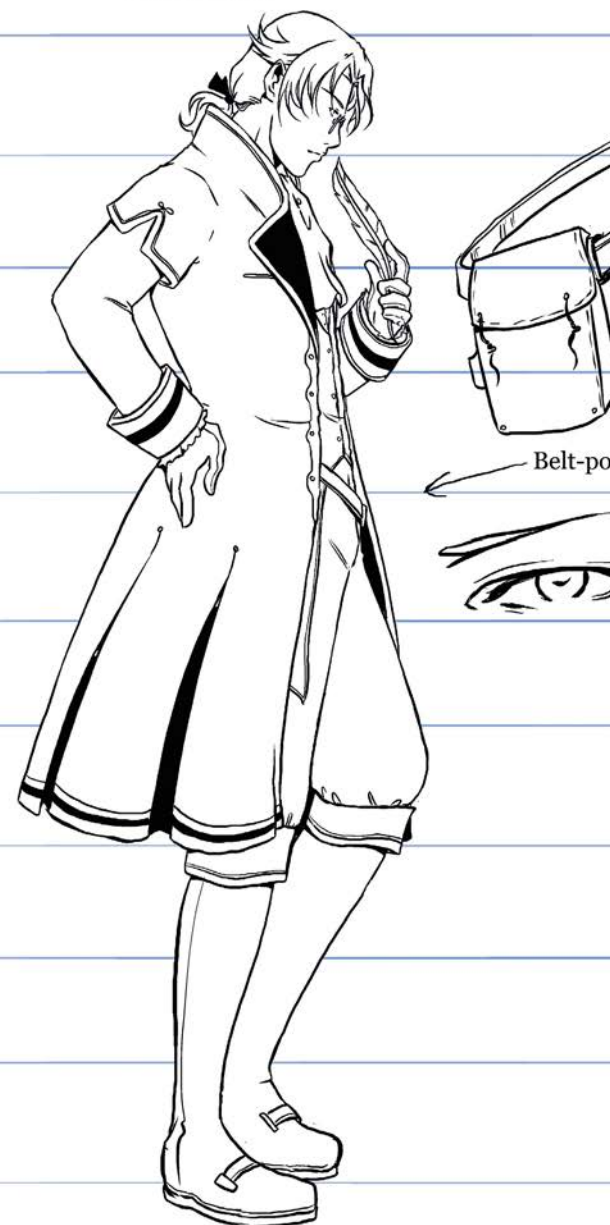
Sheets will vary depending on the project, the medium and who you're making the guidelines for, but let's take a look at some features that you might want to cover.

The main image here shows three characters from Oni Press's Avalon Chronicles book one, written by Nunzio DeFilippis and Christina Weir, and drawn by, well, me!

**1 Colour, in theory**  
This graphic novel is black-and-white, so no colour information has been included. It's also a book that's being drawn by the artist who's making the sheet, so there's little in the way of detailed instruction. Its purpose will be mainly as a memory and consistency guide, as this is a long series. This book has a separate artist providing tones, so you can see where a Manga Studio tone code has been added.



Avalon Chronicles  
Oni Press



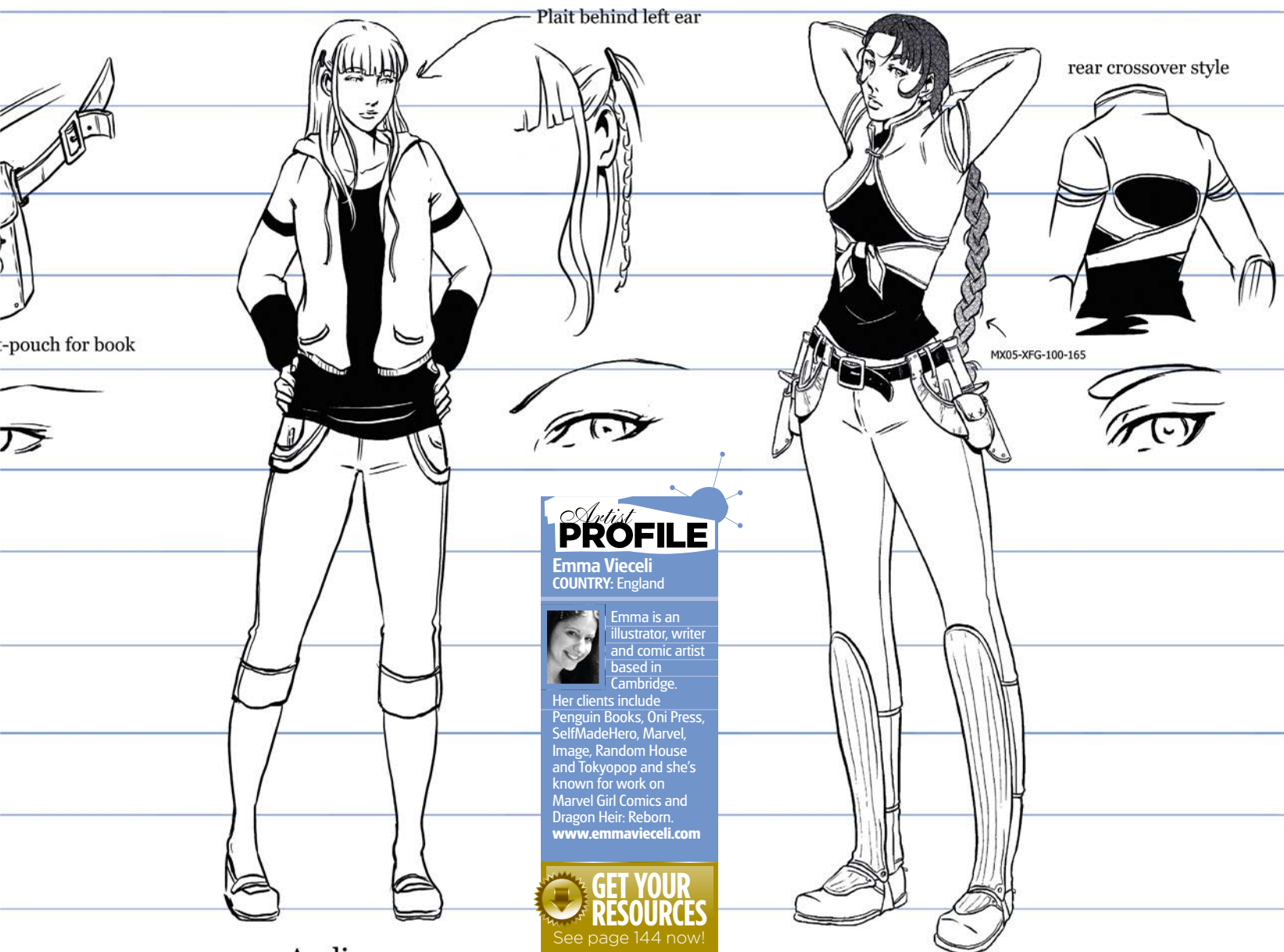
Will

**2 Multiple character lineups**  
It can be incredibly useful to create a line-up sheet – a character sheet that features multiple characters. This will give a clear guide to relative heights, and how characters relate to each other. It's a great way to make sure you don't have two characters who look too similar, to check family resemblances, or verify that all characters look like they fit into the same world (unless they're from different worlds, like in Avalon, of course!). Have fun with poses and bringing out character diversity.





DeFilippis · Weir · Vieceli



Aeslin

Cassidy



## 3 Adding Colour

Even black-and-white comics will have colour covers or illustrations occasionally, and if you want to plan any colour-centric screentone you'll need to have an idea of what your colour scheme would be, even if the readers aren't seeing it. Having multiple characters on one sheet and laying down basic colour schemes for them all together will ensure that materials like gold or leather are one uniform colour in your world.

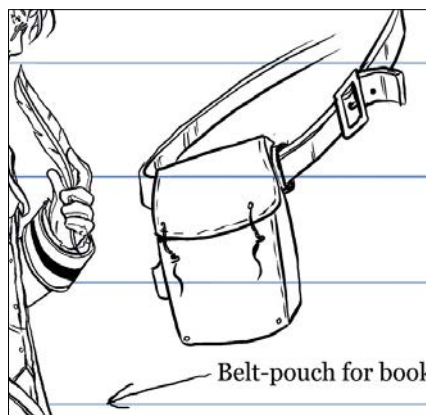






## 4 Keeping it all together

Casts can grow. Being sure that they're cohesive and yet distinctive will be important to the project's success. For The Thrill Electric project a large cast had to be created who were all wearing reasonably accurate Victorian fashion of the day. The project was also in colour, so it was important to ensure the colour schemes of each character worked together on screen. In such cases, there's nothing for it but a massive line-up. This also helped establish some character behaviour.



## 6 What can't be seen still matters

Whether for your own benefit or another illustrator's, if there are hidden elements to your character's design, make a note of them. Adding items such as belt pouches or how an under-tunic sword belt may look will help avoid that embarrassing faux pas of the mysteriously disappearing/appearing accessory (unless your character is a magic user and has a handy portal, of course). In addition, if your character sheds a layer of clothing then it's good to know what they're wearing underneath.

## PRO SECRETS

### Layer benefits

If, like me, you work digitally, really abuse those layers when creating a character line-up. I create my background measurement lines and then draw each character on its own layer. This means I can move any characters about and switch their positions if I need to see different characters next to each other. But it also means I have individual character images if I need to pull them out for something like a chapter heading.

## 5 Going into detail

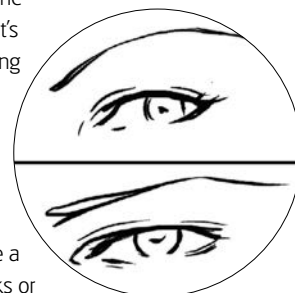
Still on The Thrill Electric, Windflower Studios was due to be drawing the comic, so sheets had to be a little more detailed. It can be helpful to offer a few different facial expressions in these cases, as well as a little description or illustrating of key points to watch out for. If a particular character will appear in several outfits then you may even want to offer a variety of wardrobe options, or depict how a certain outfit looks, say with and without a jacket.

“It was important to ensure the colour schemes of each character worked together on screen”



## 7 Each to his own

Small details such as the shape of an eye, the narrowness of lips or the curve of a brow can help define a character's face. It's well worth reminding yourself of these little touches in your character sheet, even if it's only for your own benefit. If you have a gap between books or chapters and you come back to the project after working on something else, you'll be grateful for such reminders.



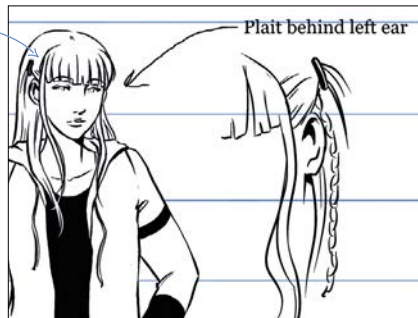


# In depth Create character sheets



## 8 About those niggling details...

Some elements of design are all too easy to miss or forget when you're drawing a character hundreds of times. With luck you'll have a wonderful editor or collaborator who'll pick up on your slips, but it's well worth setting yourself some reminders. Features that appear on only one side, like Aeslin's plait, a single ear piercing or a tattoo, can be especially tricky to remember. So add them to the sheet.



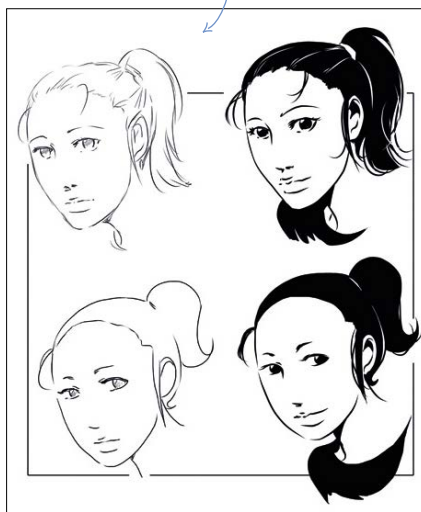
## PRO SECRETS

### Put it on display

It's no good making your character sheets and then storing them away out of view. Get a pinboard or a bit of bare wall near to where you work, and put the sheets up there. That way, when you're working on a project, you have your references right there in front of you.

## 9 Before the full sheet

Although character sheets can be used as part of the design process, ideally you'll want to bash out ideas in the usual way before you start committing to a reference sheet. A character sheet should be the place to test out heights, colours and uniformity, rather than the actual design and style of a character.



## 10 It's all about Teamwork

Of course, if you're working as part of a team, your sheets will serve as reference for your collaborators. If you have experienced colourists or inkers working with you, you'll hope they can take your references and use their skills to embellish and improve on what you set down. They may well add their own touches, and that's where an overall art editor will work to ensure everything fits, but that's part of the magic of the process. ●



PHOTOSHOP

# IMPROVE YOUR KEYFRAME SKILLS

Film and video game artist **Kan Muftic** depicts a scene in a story and conveys emotions through gestures

## Artist PROFILE

**Kan Muftic**  
COUNTRY: England



Kan is a film and video game concept artist who's worked on

Godzilla, Guardians of the Galaxy, Edge of Tomorrow, Residue, Batman: Arkham Knight, and Batman: Arkham City.  
<http://ifxm.ag/k-muftic>



**GET YOUR RESOURCES**

See page 144 now!

**F**ilms, TV programmes, video games and even 30-second adverts need great stories. In most cases, these stories are written and handed over to an artist, whose task is to transform the words into a single example of engaging imagery: the keyframe. The main goal here is for the image to be able to tell a moment of the story without any additional description.

This is what I love doing the most, because it requires all of my skills: composition, light, colours, character design, anatomy and suchlike. It's also important to

mention that keyframe illustration doesn't always require a huge amount of detail, as long as it describes the scene.

These days it's quite common to achieve this by combining a collection of photographs, resulting in a quick and dirty painting. Indeed, I do that myself a lot for my clients. However, in this workshop I won't use any photographs because I believe a lot of originality becomes lost through photo-bashing. It's our responsibility as artists not to let this speed technique take over the more traditional approaches, and to paint whenever possible. ➔







## Shortcuts

### Curves

Ctrl+M (PC)

Cmd+M (Mac)

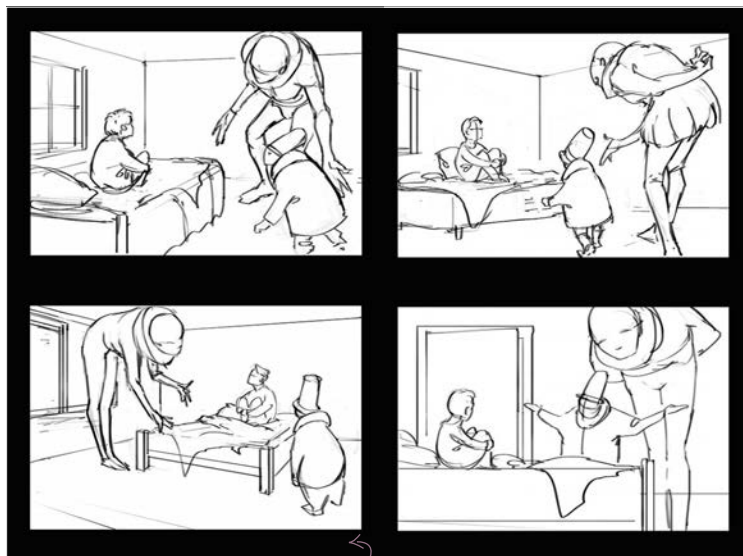
One of the best ways to adjust values and correct colour in Photoshop.

## 1 Read and digest the script

The first step I normally take is to read the script. It's an incredibly important stage because it sets up everything I do from now on. For the purposes of this workshop I conjure up a moment in a story called *The Pyjama Knight*. Jack is sitting on his bed at night, staring at Clownface and his friend Chubuscus. A strip of light from the hallway indicates a slightly open door and Jack's fear of the dark. Clownface is saying, "They have taken everything. We have no one else to go to, Jack..."

## 2 Imagining the scene

I don't just jump in and start doodling. Drawing is a form of communication, therefore I think first before I start saying anything with images. I relax with a cup of tea, close my eyes and imagine the scene unveiling in front of me. And soon, the important questions start popping up. Where would I observe this from? How do those characters behave – are they hectic or calm? What do their voices sound like?

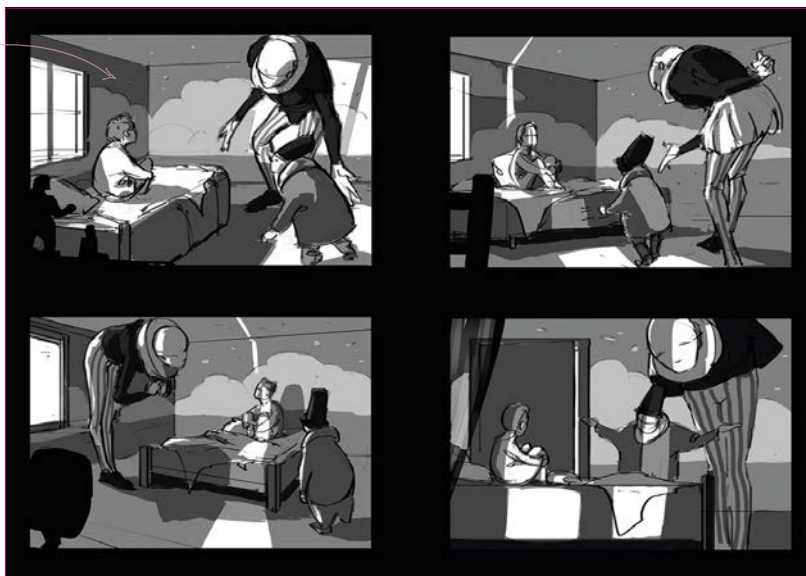


## 3 Sketching out ideas

Having answered some of those questions, I decide to go for a Spielberg meets Miyazaki type of scene. A fragile kid is visited by some bizarre but friendly characters from a different realm. They're seeking Jack's help, which is the main point of this keyframe illustration. So I centre the two characters around Jack's bed, which will make him stand out as a protagonist – and the eventual hero of the story.

## 4 Designing the light

I always try to use light as a design tool, just like I do with shapes and colours. In this scene, I want to illuminate the room with the moonlight, but I also want to have a secondary light coming from the hallway. Cool moonlight will complement the warm interior light. For this stage, I use very flat but clear values – all in black-and-white.



## 5 Colour base

Moonlight will illuminate most of the room, so I create the base colour with a simple bluish tint. I do that by going to Image > Adjustments > Hue/Saturation and ticking the Colorize box. Then I play around with the sliders, finding the right tone. I always establish my base colour from the predominant light source. If this were an exterior scene set in daylight, I'd start with a warm colour.

## 6 Begin blending

Now that I have my base, I move the Color Picker slightly towards grey and start blending in the warmer tones. I say warmer tones because grey next to a cool colour appears warm. I don't jump straight to reds and yellows – instead, I approach them gradually to keep the overall harmony. This is usually the messiest part of my process.



## 7 Warming up

I decide to bring in more warmth to the room, because I don't want the scene to look frightening. I create a new layer and set it to Overlay. Then I pick an earthy colour and start blocking it in from the lower left corner, away from the window with the cool moonlight. I place my strokes where I believe the cool light doesn't reach. However, there has to be some mixing, so I carefully blend in the strokes with the background.



## PRO SECRETS

### Start crisp and clear

It's one thing to create your personal art and experiment with abstract shapes, but even if you're very skilled at it, your clients can't tell what a messy sketch is going to become. Crisp edges are easier to blend into smooth and lost edges (and it's harder to do it the other way around). A simple black-and-white sketch with a clear value hierarchy usually does the job.





# In depth Keyframe skills

## 8 Apply rim lights for clarity's sake

I want to further downplay the bluish tint, so after warming the room up I add bluish rim lights that hint at outdoor light. They also help to define edges and the location of objects. When doing this stage, the colour progresses towards the colour of the light, not just towards plain white. I still keep everything fairly low in saturation.



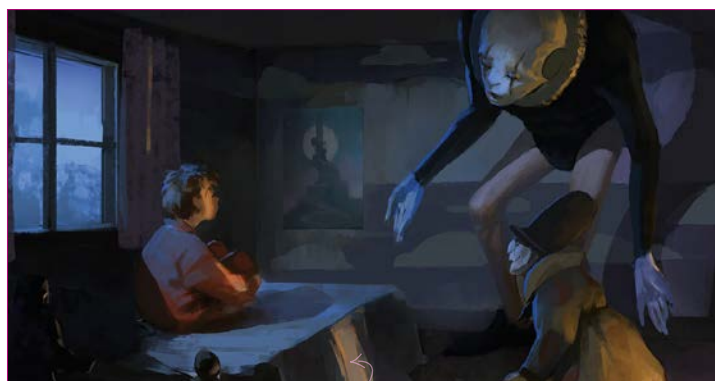
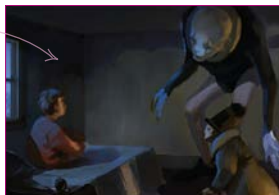
## 9 Hallway light

I roughly place in a stripe of warm light coming from behind Chubuscus and over the bed and Jack's face. The idea is to lead the viewer to Jack and present him as a character who's hiding in the shadows. All of this works on a subconscious level and it's exactly the kind of thing that helps tell the story better. Some of the light, however, has to be reflected on Chubuscus and Clownface for realism.



## 10 Body language

Jack stays slightly obscured by the stripe of light, but I want the other two characters to be expressive and connected to Jack. Clownface is a gentle giant while Chubuscus is a bundle of energy. When telling stories with characters, posture is everything. Jack is displaying insecurity, Chubuscus is curious and Clownface is exposing weakness.

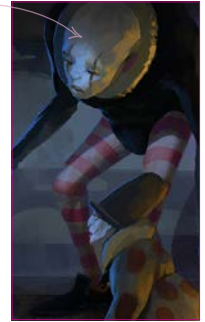


## 11 Window projection

I decide to get rid of the bright patch behind Clownface. It's an unwanted focal point and also it isn't quite accurate. So I simply paint it out by extending the colours and the tone of the wall on the left. I want to make this fantasy encounter as realistic-looking as possible – even if that sounds like a contradiction in terms!

## 12 Interesting faces

As I mentioned earlier, I want to make those two characters slightly strange-looking but friendly. I'm making Clownface look very gentle, adding large eyelashes and a harmless mouth expression. Chubuscus gets more puppet-like features, such as nose and chin. Getting his facial expression to look tense but not menacing is tricky.



## 13 Wall poster

Jack is a bit of a geek and I imagine him being a fan of video games. Perhaps that's where he meets strange people who reveal incredible mysteries, maybe even an unseen world that Clownface and Chubuscus are from. And what if there's a yearly gathering of similar-minded kids like Jack? Surely he would have some sort of poster as a keepsake or a statement?



## 14 Refining Clownface

I work on some details, mainly his face. I add a hint of his upper teeth, which instantly gives him more personality. I get caught up in rendering his hands, but realise what I'm doing and simplify them so as to not break the overall distribution of the detail. As I darken the whole environment, some of the highlighted features pop out. I'm achieving quite a cartoony palette and I'm happy with it.



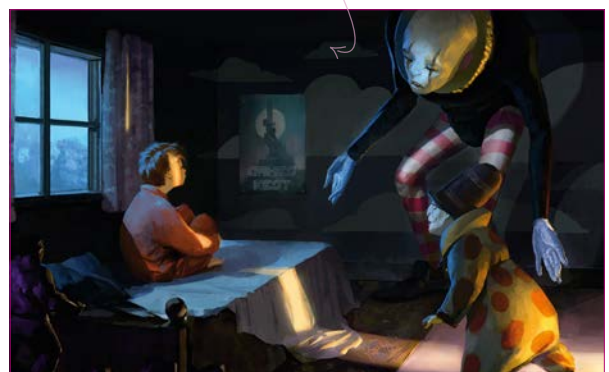
## PRO SECRETS

### The power of sketching

Never underestimate the flexibility of sketching. It's very tempting to grab photos, but they will never enable you to quickly change everything in the picture. Very often, and particularly in the film industry, you'll be expected to use photos for your concepts. I'd advise telling clients that you'll add them later on, once the layout has been established.

## 15 Finishing up

I tweak the colour scheme towards yellow and place superhero toys in the lower left corner, for more visual interest. Next I fix the wallpaper and make the clouds on it smaller and cleaner. I add details here and there, but don't overdo it because I want to keep the focus on the scene as a whole. And there it is – our finished Pyjama Knight keyframe illustration. ●





## PHOTOSHOP

# LEARN TO CONTROL VISUAL CONTRAST

**Sam Nielson** demonstrates how he's able to balance the competing demands of a complicated concept illustration using just three simple rules...

**P**ainting and animating digitally are almost without limits. You have access to pretty much any colours you want, a massive selection of brushes, as many layers as your computer can handle, and the power to introduce tons of detail and texture very easily.

However, bringing all these factors together in the same piece is likely to result in a poor illustration. For this reason, only half of good painting is about knowing anatomy, texture, light and so forth. The other half is about

controlling those choices and aligning conflicting elements to what the image is intended to say.

Most of the tricks I use to discipline my art process come from one design principle: contrast control in composition. The rules for contrast control have three parts. First, people's eyes are drawn to higher contrast areas. Second, too many high-contrast areas are fatiguing to the eye. Third, areas of interest should be surrounded by areas of simplicity or rest, and this fluctuation of rest and detail

should create paths along which you want your audience's eyes to travel. These rules are simple to remember, but difficult to apply while painting.

This control over contrasts must be expressed simultaneously in the colours of the piece, the values, the edges, the textures and more. All these things must also be done in context: the detail areas should communicate the story, while at the same time the rest areas can't be too boring or messy! Let's have a look at how this works in practice...

## PRO SECRETS

### Stylus buttons

If you have a stylus with two buttons, there's no reason for one of them to be assigned to double-click (the default). Instead, assign one of them to be a function you use frequently. I have one button assigned to right-click and the other to the drag-resize brush shortcuts (Ctrl+Alt+right-drag on PC, Cmd+Alt+left-click+drag on Mac). This speeds up my painting time a lot!



### 1 Pushing through failures

This is the hardest part! I have an idea, but when I draw it it's a mess. After a few goes I feel like a terrible artist. My problem is often story. If the drawing isn't working, I need to think about narrative: what's happening, what motivates the characters, what idea am I trying to communicate? Once I have the answers, everything usually falls into place.



### 2 Rough block-ins

One of the best ways to avoid chaos early on is to paint rough block-ins. These are the equivalent of thumbnails, but don't actually need to be small – you can do them quickly if you stay rough. Having said this, if your composition works when it's small, then it will probably work when large. I like to test the values this way, too. ➔





## Artist PROFILE

**Sam Nielson**  
COUNTRY: US



Sam has been part of the animation industry for over 20 years, providing concept art and illustration for Disney/Avalanche, Sony Pictures Animation, Blizzard Entertainment, HarperCollins, Scholastic and many others.

<http://ifxm.ag/s-nielson>



**GET YOUR  
RESOURCES**

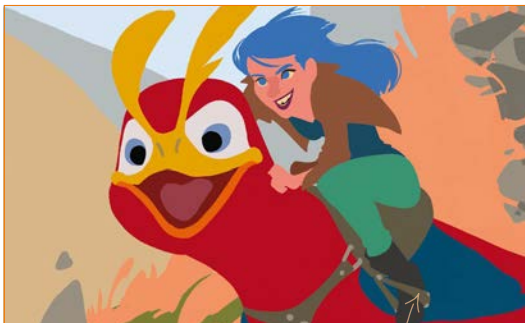
See page 144 now!



## PRO SECRETS

### The value of clipping masks

I use clipping masks all the time because they confine the painting area to the layer's edges underneath. The easiest way to activate this is to hold down Alt (on PC or Mac) and click the line between the two layers you want to link up. Alt-click again between the layers to release the mask.



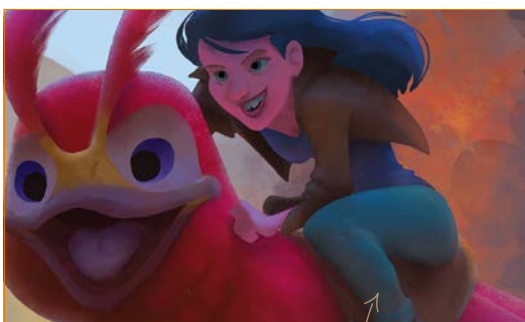
## 3 Prepping the image

I like using flat coloured layers as another test for the colours and values. The great thing about this graphic version of the image is that I can use it later to grab quick selections of those different parts of the image. I just keep a stack of layers or a single flat-coloured version under the image and then select areas as necessary later.



## 4 Start the underpainting

Once I'm happy with the rough, I start with my background. I'll sometimes begin with a colour that I wouldn't mind showing through the cracks in the painting – in this case a bright orange that pushes the intensity of the scene where it peeks through the background. I paint enough of the background in to set the context for the characters.



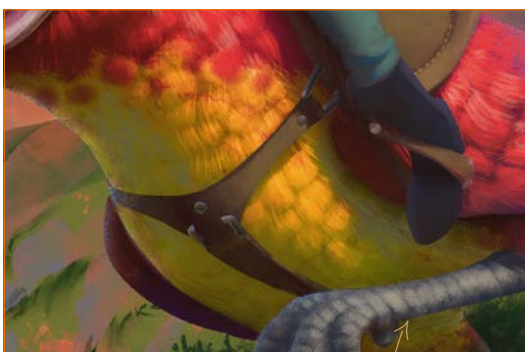
## 5 Ambient lighting

If I'm painting daylight, then the shadows need to look great. One way to do this is to start lighting the characters with the ambient light in the scene: the warm light bouncing off the ground, the cool light from the sky and the soft rim light from the explosion. This can be as detailed as I want.



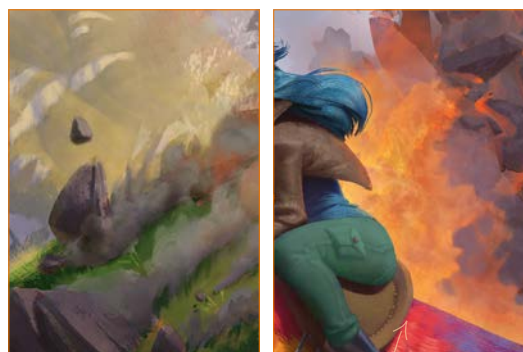
## 6 Key light sculpting

The ambient light underneath enables me to paint the sunlit areas on a separate layer and then erase it where I need shadow. This part of the painting is like sculpting: I'm pushing and pulling the light until the forms have the roundness they need. My goal is to put the highest contrasts where I want people to look, such as faces.



## 7 Cleaner transitions

Complicated colour shifts, such as the patterned gradient of the yellow feathers, are difficult to paint and can become confusing for the viewer if you're not careful. So I create a separate version of the red feathers on a separate layer, then use Curves to change it to yellow. A Layer Mask on an Eraser brush can be used to manage the transition.



## 8 Background detail

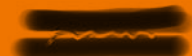
As I go, I carefully add detail into the background. I want the hillside in the background to be rocky, but not interesting in itself. I want the explosion to be energetic, but not distracting. I don't add all the detail at once because alternating between the character and the background helps me see problem spots.

## RESOURCES

### WORKSHOP BRUSHES

#### PHOTOSHOP

##### CUSTOM BRUSHES: DRY BLENDER



This is a mixer brush I use as a textured blender. The texture can keep the details underneath or blend it all together depending on the pressure you use.

##### OCCUSION BRUSH



I use this brush to quickly rough in ambient occlusion, where two objects meet each other in the shadows. You must have a tilt-sensitive stylus for this brush to work correctly.

##### DRY BRUSH 2



One of my favourite rough painting brushes. This will only work properly with a tilt-sensitive stylus.

##### PENCIL BLACK 2



My favourite sketching brush. Again, you must have a tilt-sensitive stylus for this brush to work as intended.





## 9 Highlights and accents

Reflections and highlights are fun to paint, but they can be distracting to the viewer if you're not careful. Keeping specular highlights on a separate layer as I paint enables me to adjust their intensity and position without messing around with the matte surfaces underneath.



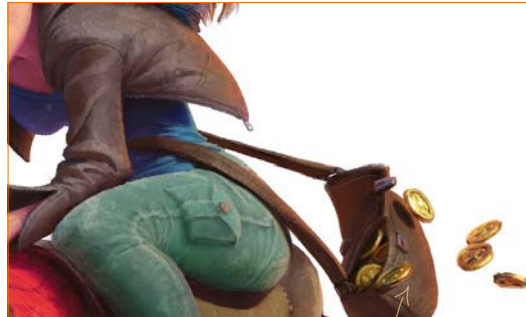
## 10 Use of big shapes

I see good composition as a series of large shapes that direct attention to a series of smaller shapes. Once I think of the background explosion as a larger shape, it's obvious that I need to group its values together so it redirects attention to the smaller shapes in the girl. So I paint orange over the area using an Overlay layer.



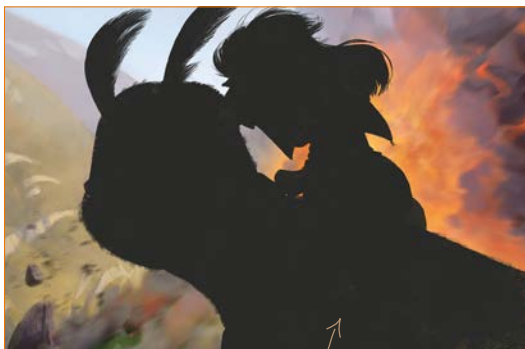
## 11 Finer details

Sometimes I'll put down textures or fine details midway through my painting so I'm aware of how they're affecting the composition. I can then compensate as I go. Other times, like with the beak of the bird, I'll immediately subdue the contrast so it can exist without pulling attention away from anything else.



## 12 Textured brushes

I have a variety of textural brushes that can be a lifesaver when I'm putting in detail quickly. The leather jacket and trousers have been bothering me the whole time, so I finally add some subtle texture to the surface, concentrated in places where I know there would be a lot of wear, such as on the seams.



## 13 Edge control

Even with all my work to control things, I feel like the characters aren't popping off the background. So I apply a Zoom Blur (found under Radial Blur in the Filters menu) to parts of the background. This makes all the background edges softer, but preserves a lot of the energy of the explosion.



## 14 Warms and cools

I wish my last step had some sparkle or flourish, but it's still about managing high-detail areas. The debris is competing with the warm colours of the bird, so I add purple to the smoke and blue-green to the grass, to help that area recede. I use a flat-coloured Luminosity layer to see colour temperatures more clearly. It's the polish the piece needs. ●

### Shortcuts

#### Fade

Ctrl+Shift+F (PC)

Cmd+Shift+F (Mac)

Enables you to focus on a stroke's shape and pressure, then adjust the Opacity.

### PRO SECRETS

#### Blending options

I use the Blend If section under Blending Options to control when and where a layer is transparent. This makes possible effects such as having a Multiply layer that affects only brighter parts of the image. In the list of your image's layers, double-click the thumbnail for the layer you want to affect. Select Blending Options and you'll see sliders in the Blend If section on the bottom: these make the layer transparent if it's brighter or darker than colours on that layer or the layer underneath.

### Shortcuts

#### Selection from layer content

Ctrl+left-click (PC) / Cmd+left-click (Mac)

layer thumbnail

Paint within one layer's shape when on another layer.



## TV PAINT

# APPLYING ANiMATiON'S 12 PRiNCIPLES

**Aaron Blaise** explains his approach to animating a larger-than-life character, and shows how he applies animation's 12 principles...

### Artist PROFILE

**Aaron Blaise**  
COUNTRY: US



A graduate of Ringling College of Art and Design, Aaron worked as an

animator for Walt Disney for 21 years. He was co-director of *Brother Bear* and nominated for an Oscar.

<http://ifxm.ag/ablaise>



**GET YOUR  
RESOURCES**

See page 144 now!



# In depth Applying the 12 principles

**M**y time spent working in animation totals nearly 30 years now. For most of that time I was at Disney, drawing for films such as *The Lion King*, *Mulan*, *Aladdin*, *Beauty and the Beast*, and more. I also co-directed a film called *Brother Bear*, for which I was eventually nominated for an Oscar.

Originally, though, I wanted to become an illustrator and had no intention of going into animation. While in college I was lucky enough to land an internship at Disney and I got paired up with and trained by legendary animator Glen Keane. He taught me about the 12 Fundamentals of Animation, which were pioneered by the original Nine Old Men

– animators who worked directly with Walt Disney himself.

These principles are: (1) squash-and-stretch; (2) anticipation; (3) staging; (4) straight-ahead action and pose to pose; (5) follow-through and overlapping action; (6) slow ins and slow outs; (7) arcs; (8) secondary action; (9) timing; (10) exaggeration; (11) solid drawing; and (12) appeal (see more on page 51).

Once I learned and applied these principles to a series of drawings and watched them come alive, I was hooked. There's something about animation that's truly magical, and now I want to share this magic, and my approach to it, with you.

In this workshop I'll take you through my process and show you how I approach animating a scene and apply these principles. These fundamentals are relevant whether you work with pencil and paper, in software such as TVPaint or even on a computer or tablet, using stop-motion animation.

Now, let's get started and create a little animation magic of our own... ➔

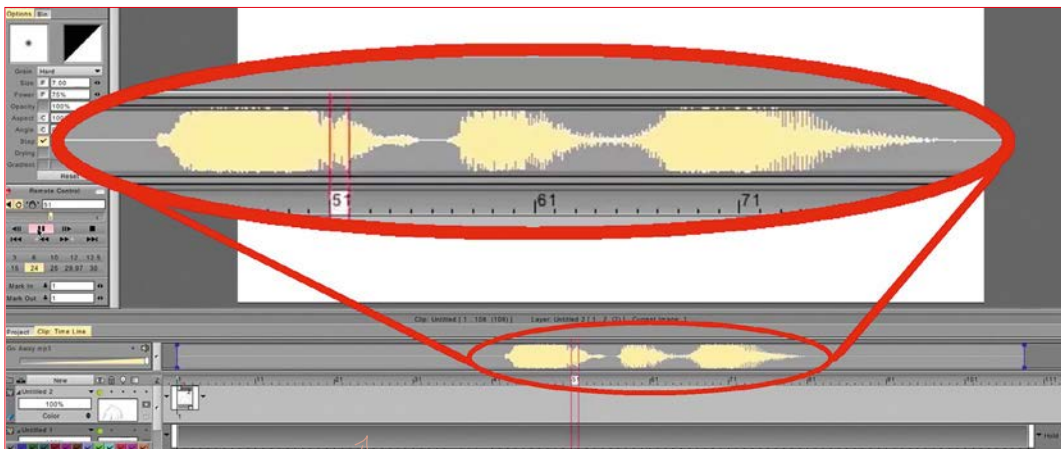




## PRO SECRETS

### Mouth shapes

Don't over-animate your character's mouth shapes. Watch *The Muppets*... Seriously, if you look at them they only have two shapes, open and closed. Yet they achieve believable dialog by hitting them at the right timing.



## 1 Import the audio

It's the combination of sound with drawings that makes for compelling animation, so it's crucial to obtain good, clear dialogue. Make sure that your audio clip evokes emotion and is something that you'll enjoy animating. You're going to be hearing it a lot!



## 2 Plan your scene

At Disney we would spend weeks planning a scene before we put pencil to paper. On *Beauty and the Beast* I created hundreds of thumbnails and did weeks of planning before I started to animate. What feeling do you get from the audio? What are the scene requirements? There are no unimportant, throwaway shots. Maximise the impact of every frame.



## 3 Create thumbnail sketches

It's absolutely crucial that you make thumbnail sketches of your scene. Typically, these will be of your key poses. You'll be constantly referring to these thumbnails as you animate. This is your opportunity to work out the scene, so try to get the best poses you can.



## 4 Draw your key poses

Now that you have thumbnails of your key poses you can start drawing them. If you are working in software such as TVPaint, lay these initial poses out on the timeline in sync with your audio. With your key poses in place you can proceed to creating the rest of the animation. Key poses are also referred to as keyframes.



## 5 Breakdown the scene

The term breakdown means the important pose images between keyframes. You're breaking down the motion into a series of smaller and smaller poses. As you space these breakdowns along your timeline, you'll start to see a sense of movement. It'll be choppy at first, but this process eventually creates the feeling of life.

## PRO SECRETS

### Keep it simple

A character that has a simple appearance and can be "constructed" with various shapes will enable you to animate it more easily from various angles. This will give you more ability to focus on the most important part: the acting.



# In depth Applying the 12 principles



## 6 Acting out the scene

Animation and acting are closely related. You don't need to be an actor to animate, but it's important to rehearse your scene. You need to convey emotion and your scene needs to be believable. Get up and act it out, so that you gain a sense of the timing and physics involved. Many animators keep a mirror at their desk and take note of their facial expressions while saying dialogue.

### Shortcuts

Full screen  
0 (PC & Mac)

In TVPaint, press  
the zero key  
to display a full  
screen to  
animate on.



## 7 Keep your drawings loose

Work fast and efficiently: keep your drawings loose and fluid so you don't get bogged down in detail. This will enable you to move through your scene quickly without losing momentum. However, ensure volumes and anatomy stay consistent! I love the feeling of the hand-drawn line. Some may prefer a crisp edge, but this isn't the time for it. You can clean up your drawing afterwards.



## 8 Flip your images

When working in traditional animation you would flip back and forth between sheets of paper to see if the movement was correct. Working digitally, you can achieve this same effect (and more) with the Onion Skin tool. The tool enables you to see each drawing or frame overlapping the previous and next ones. Make sure you continually use it to maintain consistency. ➔

### PRO SECRETS

#### Act on your new ideas

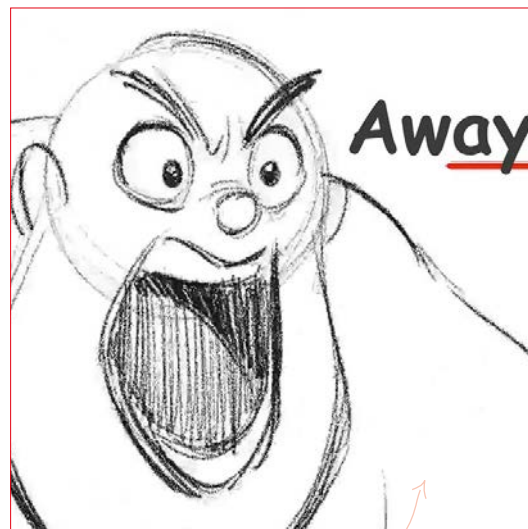
Don't be afraid to change up your animation on the fly. Quite often, as I get into a scene after spending a day or two thumbnailing, I find a more entertaining way of acting it out. Sometimes we can only make these discoveries once we get into the scene and start actually drawing it out through the character. Remember, your thumbnails are your starting point. Always look for ways to improve the entertainment.





## Remember the fundamentals

**9** While animating your scene refer to the 12 Fundamentals of Animation I mentioned in the introduction. Using exaggeration and squash-and-stretch in your poses will enhance the feeling of emotion. Likewise, incorporating anticipation and overlapping action into your drawings will give your scene a sense of life. Using these in combination will give your scene a sense that it's grounded in reality.



## 10 Animating dialogue

When animating a dialogue scene, don't overdo it. Creating a mouth shape for every syllable is a common mistake that makes animation feel unnatural. Focus on the key sounds, major vowels and hard consonants. And create mouth poses a few frames before the sound. If you study speech in slow motion you'll see our mouth starts forming



## 11 Make use of arcs

One approach that will take your animation to another level is the use of arcs. In the natural world things tend to move in arcs. Balls travel in an arc to the ground. Butterflies tend to float in a series of overlapping arcs. Playing with the concept of arcs through space (X, Y and Z axes) will give your scene a much more dynamic feel.

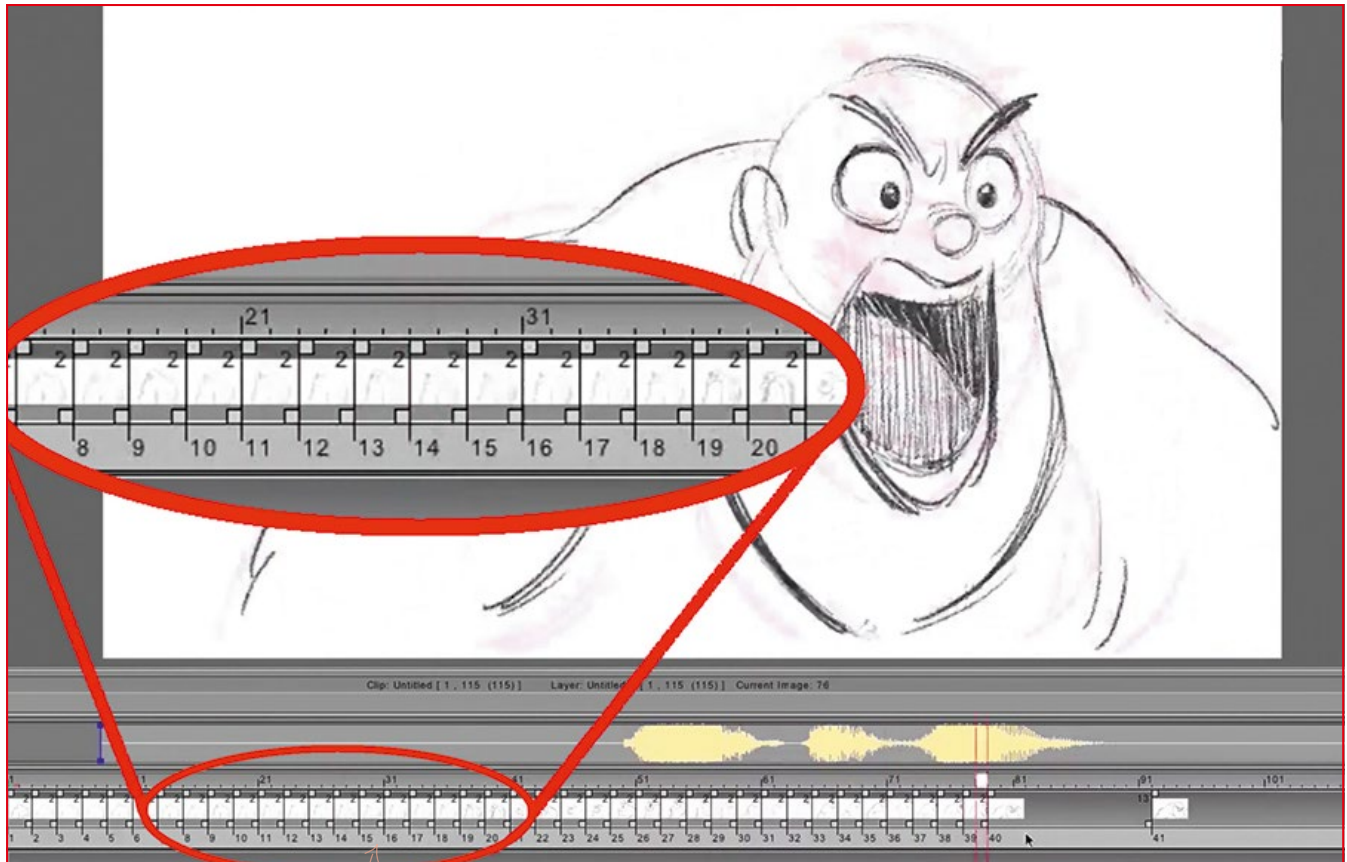
## PRO SECRETS

### Consider your workload

The more intricate a character's design, the longer it will take to animate. For example, when I designed the character of Rajah in Aladdin I tried to give him a simple and almost geometric design to his stripes. This conveyed his nature as a tiger to the viewer, but didn't make each drawing too labour-intensive.



# In depth Applying the 12 principles



## 12 Animate on 2s

The eye perceives individual frames as continuous motion at the standard movie frame-rate of 24 frames per second. Life-like animation is animated “on 2s”: we hold each image for two frames. Usually 12 unique drawings for each second of a scene is enough. However, for faster action for example, you may need more for smoothness.



## 13 Add “in-betweens”

Similar to breakdowns, “in-betweens” is an animation term that refers to the images or frames that go in between the breakdown poses/frames. These are all the rest of the drawings that flesh out your scene and give it a life-like feel. Continue to create these in-betweens (typically on 2s) until your scene looks polished and believable.



## 14 Explore new techniques

Even after nearly 30 years of animating I’m still enthralled with the magic of it. Seeing your images come to life is a special feeling. I’m still experimenting and discovering new techniques, and I would encourage you to do the same: experiment with tempos, pacing, stories and character attitudes. The more you do it, the better you’ll get. Have fun! ●





*MAYA, YETI, RENDERMAN (RIS), NUKE*

# MASTER YETI TO CREATE CARTOON FUR

**Romain Lavoine** reveals how to create woolly cartoon characters and set up your animation scene

**S**wiff is the story of a dirt-hating extraterrestrial who is travelling in space. He breaks down and crashes on Earth in the countryside. In this 'terra incognita' animated adventure Swiff goes looking for a compatible fuel source for his spaceship. During his quest, he finds himself face to face with a hyperactive little boy who is definitely going to give him a hard time.

While working on the short film, I had the opportunity to use Peregrine Labs' Yeti and Pixar's RenderMan (RIS). In this tutorial, I will explain some of the key techniques used in Yeti to make the sheep's wool (fur), and an instancing solution for Maya. The software can be complicated, but it can be easier than you think.

I needed to learn Yeti for Swiff, and along the way picked up some useful tricks that I hope you will find equally handy for your animated film projects. Over the coming pages, I will share my process for setting up and combing fur in Yeti, as well as how we created the scene for our short.

## Artist PROFILE

**Romain Lavoine**  
COUNTRY: UK



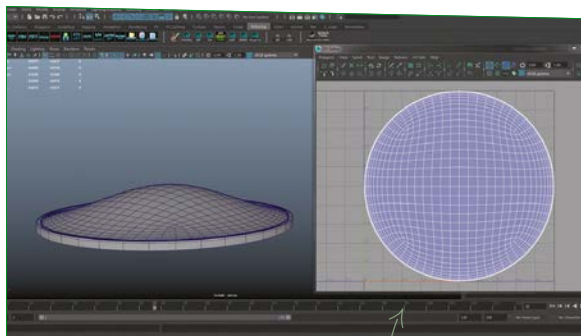
Romain is passionate about detailed environments, and specialises in lighting & compositing.  
<https://www.artstation.com/lavoineomain>



**GET YOUR RESOURCES**

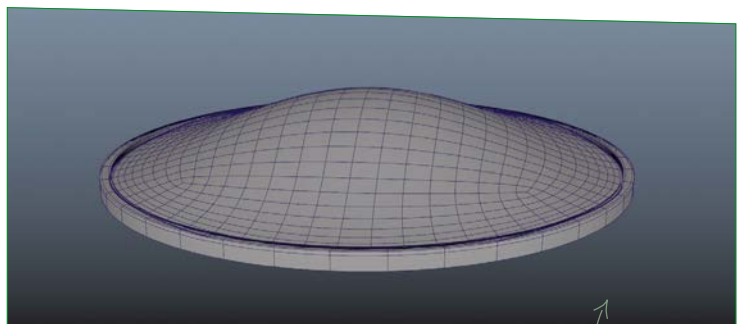
See page 144 now!





## 1 Prepare the terrain

The first step is to establish a good cartoon environment for the character we'll create and add later on. I tend to work in a different, smaller scene to the final scene, and when I'm happy with the look of the object or terrain that I'm working on, I reimport the asset into the final scene. For the grass, I create a basic terrain in Maya and I import my own light rig, which contains multiple lighting conditions for different times of day.



## 2 Create the terrain and unwrap UVs

For this terrain, as I want to work in a smaller area than my actual terrain, I create a rounded surface with just a few polygons, where I can populate some grass. Yeti uses a cache system and it can take a long time to generate if you're using big terrain. By using a smaller version of the surface, I make sure that the caching time doesn't exceed a few seconds. The goal is to define the look of the grass so there's no need to waste time on a big surface. Once I model the basic terrain, I unwrap the UVs using Maya's default tools.

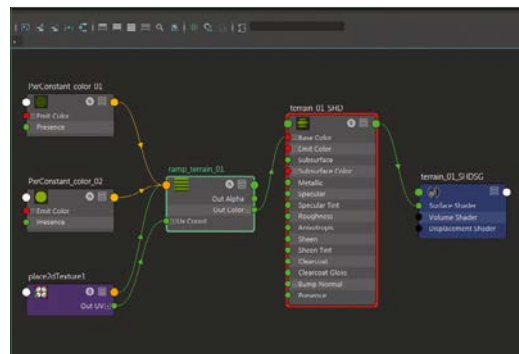
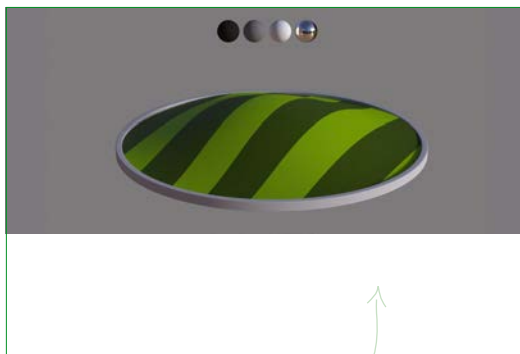




## PRO SECRETS

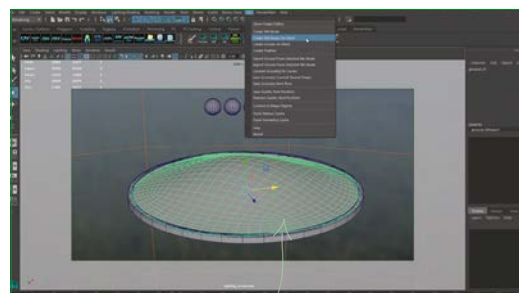
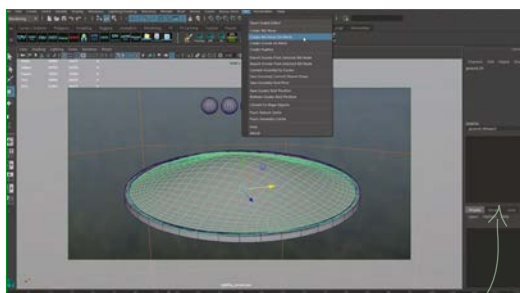
### Time saver

For the short film, we had more than a hundred shots to set up with grass. I created a simple script to automate the ramp creation process. Using Python allows you to automate simple tasks and can save you a lot of time.



### 3 Adding the stripes

We wanted everything in our short film to be striped. To do this I use Ramp, Maya's procedural texture solution. I create a ramp in Maya and plug in a PxrDisney shader. It's just for preview so you can use any shader. Use the place2dTexture to repeat your ramp as much as needed. In my example, I do it directly in the ramp to add a bit of variation in the stripe width. I also connect a PxrConstant in every colour of the ramp for more control.

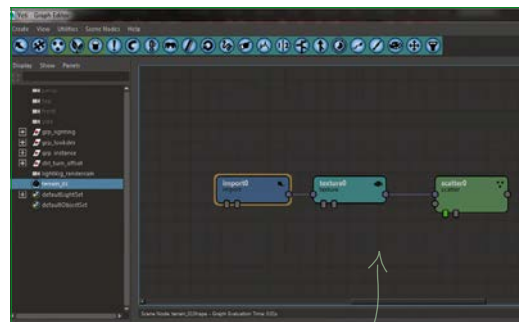
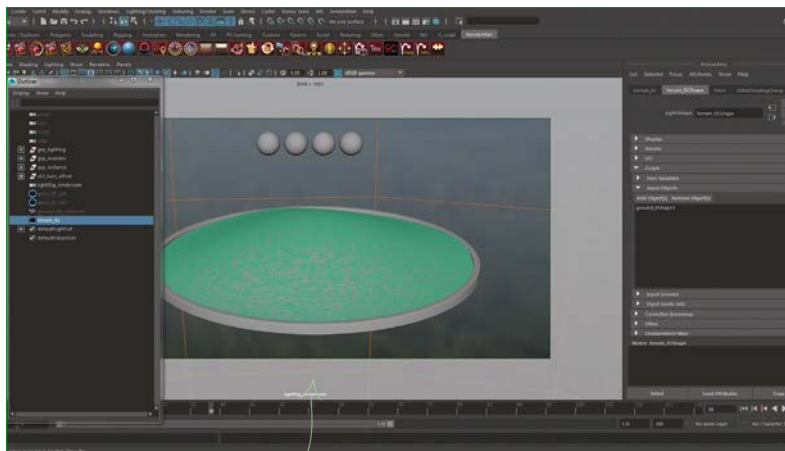


### 4 Prepare the geometry for instancing

We decided to instance polygons in order to get more control over the look of the grass, but you can also create a fur system in Yeti and use it as grass. If you decide to use polygons, create a few bundles of grass in Maya using basic modelling techniques. There is no need to add a lot of polygons as the tiny details will get lost. You also have to make sure that your grass is at the centre of the world in Maya to make it work with Yeti.

### 5 Open Yeti

Yeti is very powerful and offers great optimisation possibilities. It allows you to instance millions of polygons very easily. Start by selecting your terrain and go to Yeti > Create Yeti Node On Mesh. Open the Yeti Graph Editor. In order to control the stripes separately, create multiple Yeti systems corresponding to the different areas of grass. I convert my coloured Ramp to a black and white ramp in order to use it as a density map in Yeti.



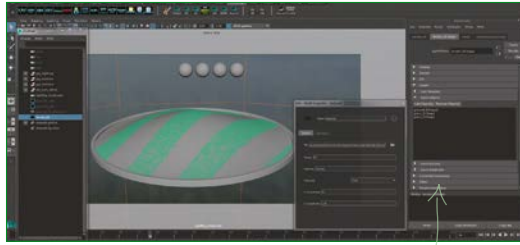
### 6 Nodes in Yeti

Next, select your Yeti node in the Outliner, and go to the Attribute Editor. You should see your terrain in the Input Objects tab. If you don't, add it. Add the objects you want to instance and make sure that they are at the centre of the grid in Maya.

### 7 Setting up nodes

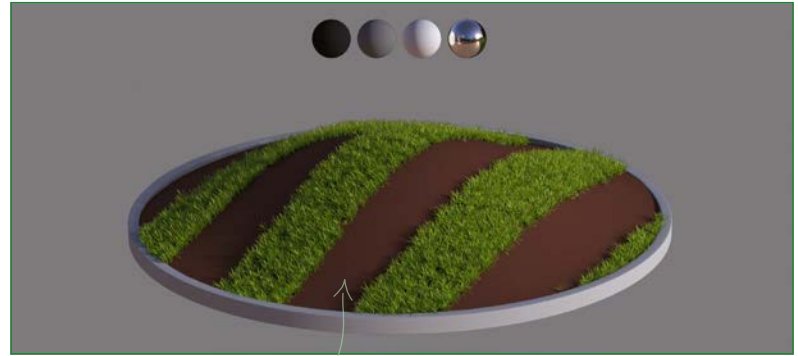
In the Graph Editor, create an Import node, a Texture node and a Scatter node. The texture node will be used to control the density of our instanced geo. In order to do so, I bake my ramp into a texture. It allows me to retouch the map afterwards if necessary. I use Nightshade Blockout to bake the Ramp. It's free and available on [www.creativecrash.com](http://www.creativecrash.com).





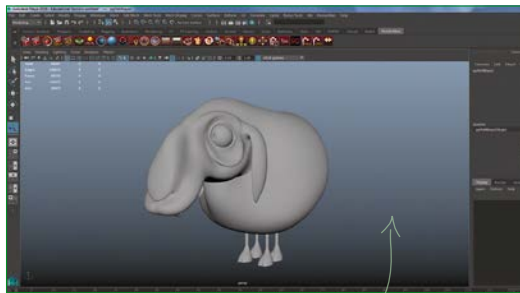
## 8 Instance your geometry

Once you've connected your densityMap in the Texture node, add 'density' in the attribute of the node. Create an Instance node and another Import node. Use the Import node to choose the geometry to instance and connect it to the second input of the Instance node. Set the Instance node to Element and add scale and twist variation; use the Scatter node to change the density. For more variation, add a custom attribute, create a few graphs with different types of grass and merge them.



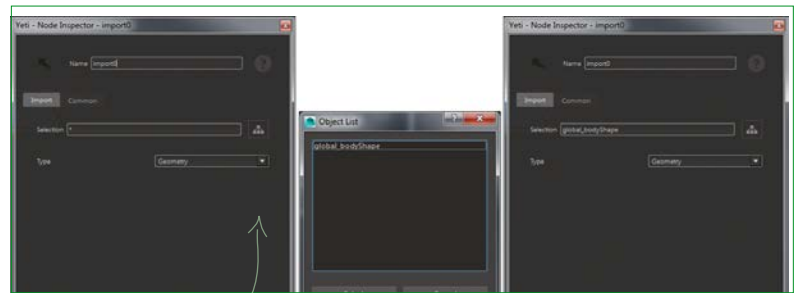
## 9 Adding shaders

We used RenderMan RIS for rendering. The materials in RenderMan are physically plausible and offer great possibilities. I use a Pxr LMDiffuse as a base and connect different variations of the texture for the front and the back. Then I use a LMLayer to add a specular layer over it. I've also played with the translucence of the LMDiffuse to get a softer look. Simply assign the shader to your Yeti node to make it work with the instances.



## 10 Creating the sheep

Select your mesh and go to Yeti> Create Yeti Node On Mesh. Do the same with Yeti> Create Groom Node On Mesh. This will create a pgYetiNode and pgYetiGroom in your Outliner. Select the pgYeti and go to the Yeti Graph Editor. Click on the Import Button and double-click on the node Yeti has created. This will pop up in a window. Make sure the type is set to Geometry, then click the button on the right of the Selection field.



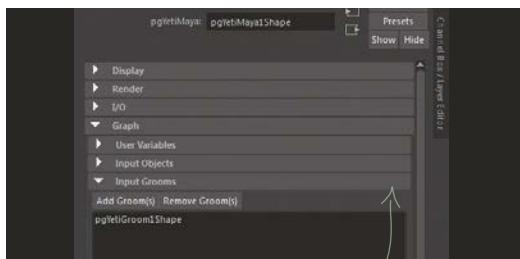
## 11 Apply fur

In the new pop up, select the object you want your fur to be applied to and click Select. If you need to manually add objects in the list, select the pgYeti, go into the Attribute Editor, under Graph> Input Objects and click on Add Object. Weirdly, sometimes the list doesn't seem to update after adding a new object. Select anything else in the Outliner and then select your pgYeti again to see the new object correctly added to the list.

## PRO SECRETS

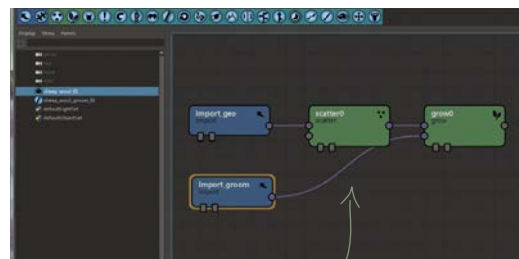
### Sheep shape

The sheep in our film have very small feet and their wool has to be striped. We wanted them to be very stylised even in their behaviour. The character design and the modelling were done by Alexis Agliata. I was in charge of the texturing, the grooming and the shading.



## 12 Import your groom

Select your pgYeti node and go to the Attribute Editor (Ctrl+A). Under Graph> Input Grooms click on Input Grooms. Select the groom that you've created. Go back to the Yeti Graph Editor and click on Import. Select and double-click the new Import node. Set the type to Groom and select the groom like we did previously with the geometry. You now have two import nodes in your graph. Keep your graph organised and name your Yeti node correctly.



## 13 Start grooming

In the Yeti Graph, create a Scatter node, connect the import\_geo to the first input of the Scatter. Select the scatter and create a Grow node. If you double-click on the Scatter, you will be able to increase the density. Connect the import\_groom to the second Input of the Grow. Select the Groom node in your Outliner and go into the Attribute Editor. You will find a wide range of tools that you can use to create various hair effects.



## PRO SECRETS

**Length change**  
Note that you have a Length Multiplier in the Grow node if you want to increase or decrease the length of anything.



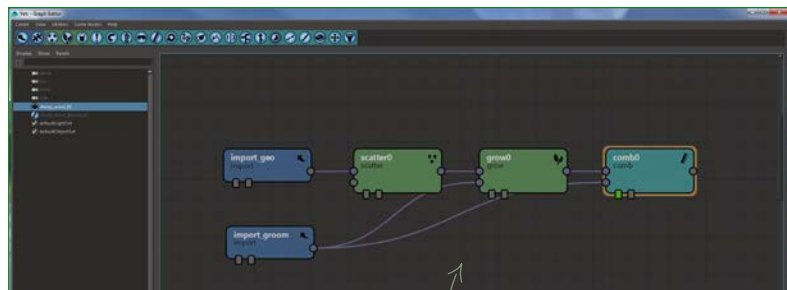
### Populating strands

**14** Start by pressing the (+) button. This will allow you to populate your mesh with strands that will be used to create the hair in the pgYetiNode. Under the Brush tab, you will find Radius and Strength parameters. Under the Strand tab, there is a slider called Initial Strand Length. Increase this a little bit if the default parameter doesn't fit what you need. Click on your mesh to populate strands.



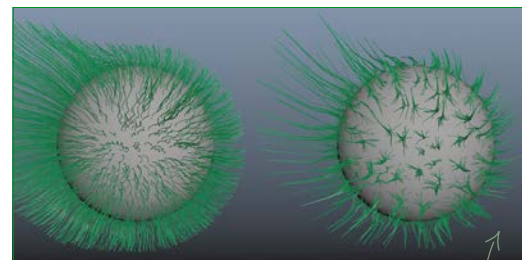
### Control the length

**15** You can easily control the length of your strands by going to the Attribute Paint tab. Simply double-click on the Length parameter, set the Value to the number you want and set the Mode depending on what you want. The Multiply and Randomize modes can help you create a lot of cool variations. For my sheep, I increased the length of the head area to match the original design.



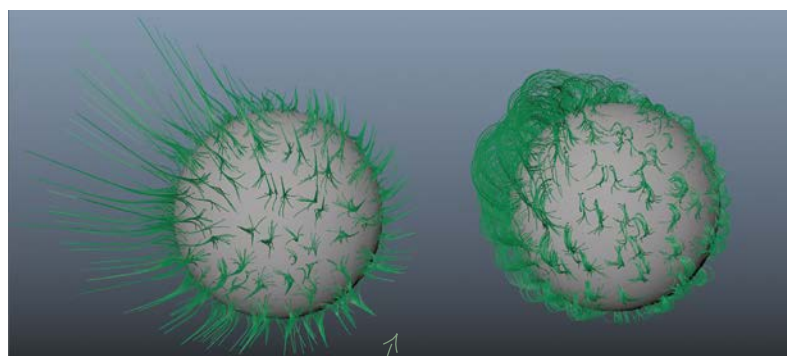
### Using the comb node

**16** It's time to create a bit of mess. Create a Comb node. Connect the Grow to the first Input of the Comb and connect the Groom to the second Input. At this stage, I play with the different tools in Yeti to create variations. Take your time, especially if your character will be seen from different angles. When I am done tweaking the strands, I add a Curl node. It creates some nice curling effects in every strand. This adds a lot of variations and makes your fur look more realistic.



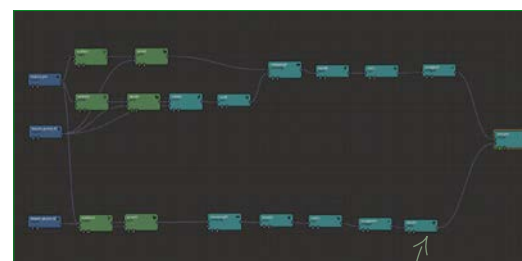
### Understanding clumping

**17** The Clumping node is one of the most important nodes in Yeti. To apply the Clump, select your current network and duplicate it; create a Clump node. Play with the Density and the Length parameters on one of the networks to enhance the effect. You can play with this technique many times in your grooming network to make multiple clumping effects. Note that you can also use the Clump tool to enhance the clump effect in some areas.



### Bend the clumps

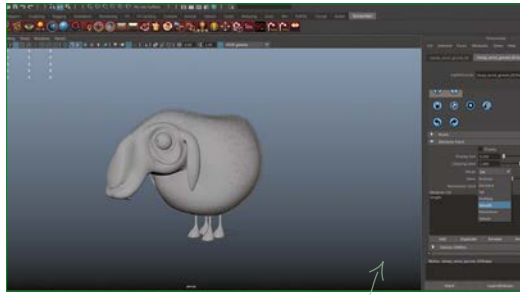
**18** To finish my base network, I add a Bend node (which in this case is crucial to bend the clump we previously made and get the look we want). Playing with the combination of different nodes allows you to get subtle and very cool effects with little fuss. This leads us to the Merge Node and how best to use it.



### Populating strands

**19** Start by pressing the (+) button. This will allow you to populate your mesh with strands that will be used to create the hair in the pgYetiNode. Under the Brush tab, you will find Radius and Strength parameters. Under the Strand tab, there is a slider called Initial Strand Length. Increase this a little bit if the default parameter doesn't fit what you need. Click on your mesh to populate strands.





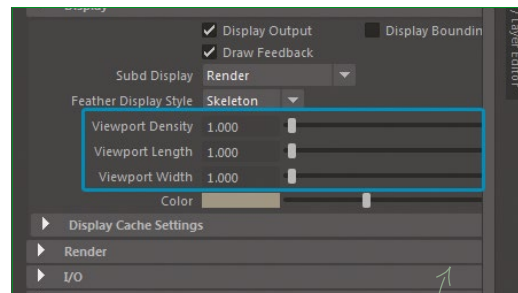
## 20 The Width node

To complete my graph, I need to control the width of my fur. I create a Width node and put it at the end of my graph, then I am able to control the width of the base and the tip. I get pretty good results with a value of 0.07 for the base and 0.03 for the tip. There is also the Multiplier parameter if needs be.



## 21 Optimise your display

Optimisation is very important when dealing with fur. The more fur you have in your scene, the harder it will be to navigate. You can hide the Yeti Node by going into the Show Panel (Viewport) and unticking Plugin Shapes, or by using the attribute provided in the pgYeti Node. In the pgYeti, you will find a Display tab. Three parameters are available to control the display (and only the display) in the viewport: the density, the length and the width.



## 22 Optimise your render

In the pgYeti under the Display tab, there is a tab called Render. You will find the exact same parameters as in Display, but for rendering. I like to set my density value in the Scatter node and set the render density after that. On some shots, the sheep are quite far from the camera so these don't need much density. I decrease the render density accordingly and refine.



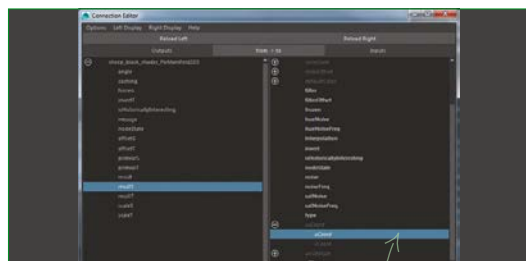
## 23 Make six variations of the scene

The nice part about staying loose while painting and not worrying so much about clean lines is that the painting process can go very fast, you'll be done before you know it. I decide to paint six more versions of this same scene with different moods, and some of these take as little as 10 minutes.



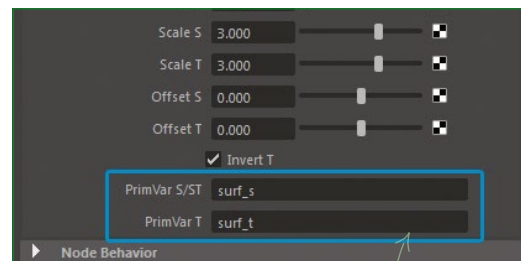
## PRO SECRETS

**Render Density**  
You can play with the Render Density parameter to increase or decrease the overall density of your graph.



### 24 Create the stripes

The final thing to finish the sheep is to add the stripes. I could use the same techniques that I used for the grass but with fur, but there is another method. After creating a ramp with a series of stripes, I create a Pxr Manifold and I connect it to the Maya ramp. Without the Pxr Manifold, it won't work properly. In the Connection Editor, connect the Result S (Pxr Manifold) to uCoord (Ramp) and ResultT (Pxr Manifold) to vCoord (Ramp).



### 25 Finish the stripes

To last thing to do in order to make the stripes work is to add the correct information in the Pxr Manifold. Add surf\_s in PrimVar S/ST and surf\_t in PrimVar T. Note, if you are not using a Maya node — you want to use a texture that you painted, for instance — simply create a PxrTexture and drag and drop the Pxr Manifold in the Manifold field of the PxrTexture. Once the stripes are set up, I work more on the shader in order to get a nice look.

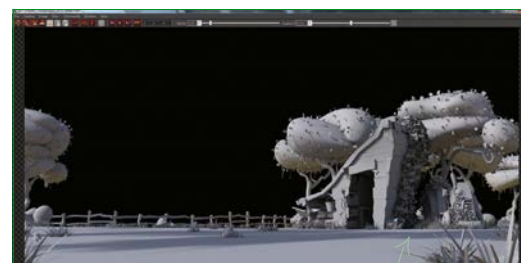
## PRO SECRETS

**Importing assets**  
In order to be more efficient when dealing with a lot of assets, I create a Python script with a simple UI that we use to import our assets. Navigating through all the folders just to get a Maya file and import would be very time-consuming.



### 26 Importing the scene

Now all the assets are created, textured and shaded, it's time for me to gather them all into the scene. I start by creating a new scene in Maya and I import my main assets. I add the grass at the end of the process because it's quite heavy for Maya and not essential at this point. The important thing is to get the main elements to start the lighting. Keep your Outliner as clean as possible.



### 27 Start the lighting

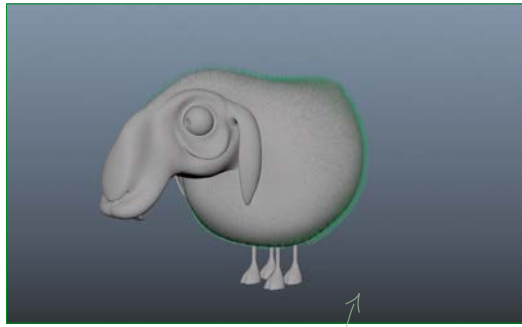
The lighting of my scene is daylight, the sun is high and some clouds are casting shadows on the ground. I create an HDR of one of our scenes that we use as a base in the main environment shot. Then I add a simple Directional Light to enhance the lighting direction. To enhance certain areas, I put some colours in the light and shadows or plug in some textures. This creates contrast.



### 28 Adding the grass

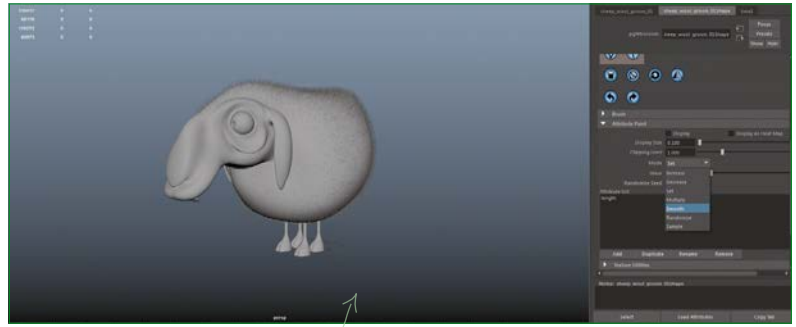
Using the technique that I explained before, I apply the grass to my main terrain. With my camera angle, I don't need the same density of grass everywhere. I simply split the terrain into different meshes and create a different Yeti node. I reduce the Render Density of the grass. The scene looks the same but the caching time is reduced. Optimise your scene as much as possible, especially when you are working with instances, otherwise it can become too large.





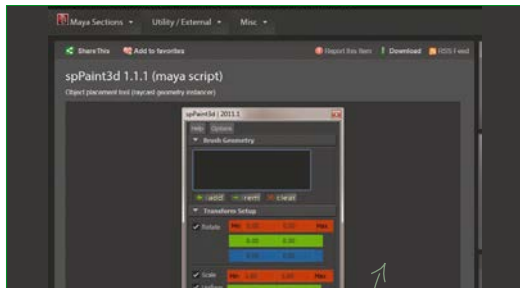
## 29 Placing plants

It's time to go into detail. I start by adding mushrooms all around the scene, then some plants. I also add trees in the background to add variation. The more variation you add, the better it will be. Our universe is very colourful and it was not always easy to deal with it. Most of the time, I import a simple version in Photoshop and do a couple of tests with various colours.



## 30 Adding rocks

I want to make the ground more interesting so I add more variation of colour and textures in the grass. I decide to add some tiny rocks. I've found a very cool, free script called RockGen from Creative Crash ([www.creativecrash.com/maya/script/rockgen](http://www.creativecrash.com/maya/script/rockgen)). I launch the script, choose the number of rocks, and their height and click Generate. I can now place these rocks in my scene.



## 31 Using spPaint3d

spPaint3d is a must-use script on Creative Crash ([www.creativecrash.com/maya/script/sppaint3d](http://www.creativecrash.com/maya/script/sppaint3d)). It enables you to duplicate or instance a series of meshes on a surface. This is very useful for an environment scene like this one. It allows me to place all the clovers, the rocks and the plants randomly in a very short amount of time. There are a lot of parameters I can tweak just to add variation in the placement of my meshes.



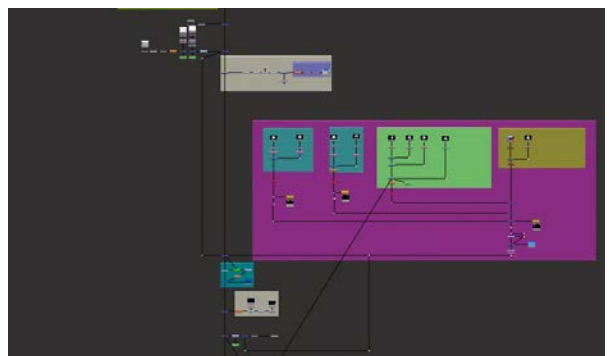
## 32 Splitting your scene

In order to have more flexibility in compositing, I split my scene into different parts. Splitting your scene really helps when you need to tweak particular elements separately. I use different render layers to split my assets and recombine them in Nuke. For the background, I create a Yeti node on the hill using the same technique as the grass. I work in a different Maya scene to keep it light. Once the hill is created, it can be reused in other shots.



## 33 Finishing using Nuke

We use Nuke for compositing. In an environment scene like this one, I really recommend adding a bit of atmosphere (using the ZDepth as a mask) to help the legibility of your image. After this tiny modification, I use a few Grade nodes to enhance some parts of the image using the ID channel. To complete, I add a bit of vignetting, a spot of depth of field and a touch of chromatic aberration. ●





## PHOTOSHOP

LEARN TO RECREATE  
CINEMATIC LIGHTING

Without light there would be no image to see. Here, **Woonyoung Jung** shows you how easy it is to add a new dimension to your animation concept art

**W**hen someone asks me why lighting is so important in my painting process, I'd say it's because nothing can be seen without it. Light creates value and changes hue in objects. Light isn't an absolute element to make an image, but it's the most powerful element in image development. I have more fun when I create the illusion of depth in my painting with lighting, because

only through light can my thoughts become a tangible object. It's a powerful experience when you see the realistic interpretation of your own imagination.

In this workshop, I'll explain how I use and approach light to create a believable scene, which I want to call my own way of creating a cinematic lighting effect. I've been fortunate enough to work with some talented

cinematographers in lighting. I've learned a lot from them and have borrowed many concepts of lighting from their film-making process.

I've broken down my process into a few simple steps – I promise that it'll be a fun and logical approach. I say logical because it's not an artistic colour-picking process, but more akin to setting physical lights in a real location or on a film set.



## Shortcuts

Lock  
transparent pixels  
(PC & Mac)

Once you lock transparent pixels, you can paint only within the image pixels. Great for detailing.

**1** Deciding on the composition

Although I start each piece of art in a different way, recently I've noticed that sketching helps a lot towards the end of the process. Drawing is like a map for my painting journey. I always put my drawing layer on top to check my progress while I'm painting. It's easy to lose your way during the painting process and go in the wrong direction. For this workshop, I'll go with the second composition.

**2** Creating shapes

Before I start painting, I fill in the background with any value but white, and create shapes with the Lasso tool that will become useful later on. I don't worry about producing perfect shapes – it's more about getting big shapes from the drawing, which will enable me to see the composition in a different perspective. The drawing layer is on top, but I lower the opacity to concentrate on shapes rather than the lines.

**3** Dividing shapes

I now split the shapes into different layers, which will give me more control further down the painting process. For instance, if I want to add some more details to Frodo's left hand, I could just load the selection from the hand layer and paint those details without worrying about ruining the trousers and sleeves. When I disassemble my shapes, I give each one a random value or colour to make them more readable. Then I label each layer so that I can find them easily, especially later on. ➔

Artist  
PROFILE

**Woonyoung Jung**  
COUNTRY: South Korea



Woon was born in Seoul and studied concept design in the US. He worked on Puss in Boots and Rise of the Guardians.  
<http://bit.ly/ifx-wjung>



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## 4 Starting on the background

For this piece, I only know that these characters are in a forest, but I still don't know what kind of forest I want to paint. So I find forest ground photo textures and start to place them randomly on to the background. On top of those, I paint with some texture brushes to integrate different photo textures. It's all about the big idea, and the feeling that I develop.



## 5 Introducing textures

Now I go back to my shapes and loosely fill in the local colours. My aim is to create interesting textures, because I'm expecting happy accidents later on when I paint on top of these shapes. I know that when I have any sort of texture on my painting, my piece will be warmer and I'll avoid that cold, CG feeling.

## 6 Applying shadows

I want a strong moonlight to come in from the right-hand side of the screen, which should create a fantasy mood. The main light source is Frodo's torch, but before I light the torch, I think about the shadows that are created by the moon. I create a Multiply layer on top of the shapes and fill it with dark blue, to indicate that it's night-time. On top of that I set up another Multiply layer with a darker blue for the moon's shadow. I need to start thinking about values now. To check them, I create a Color layer, fill it with black and put it on top. I regularly turn this layer on and off to assess my values.



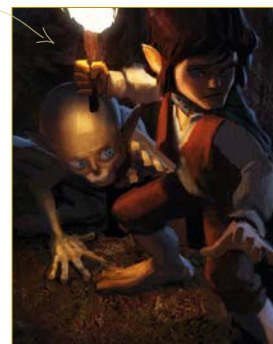
## 7 Creating warm light

I have lots of cool areas in my image. Now I need to add warm light from the torch. To do this, I create an Overlay layer under the night-sky fill layer, click Select > Load Selection with both characters and fill the selection with a warm, orange colour that I've picked from a fire photo reference. My warms aren't obvious yet, because I've got lots of dark blue Multiply layers above the orange Overlay layer. So I create a layer mask on each blue Multiply layer and remove the blues. Once a colour has been multiplied, the original becomes lost. Layer masks enable me to retain the original colour.



## 8 Balancing my colours

My warm colours still aren't strong enough, so I increase their saturation. I also paint the torch fire and moonlight on the characters, to balance out the warm and cool colours. Now I have solid value and colour information. This idea makes more sense to me than a traditional block in, which is blocking in with your own choice of colours. Because the colours are logically created by combining different layer modes, I don't waste time choosing colours. When I start my images in black-and-white, I end up painting them over again in colour because I have a poor sense of value. Starting an image with colour quickly gives me a working colour and lighting setup.



## RESOURCES

### WORKSHOP BRUSHES

#### PHOTOSHOP

#### CUSTOM BRUSHES: COLOUR TEXTURE ROUND BRUSH



I use this brush a lot when I do big strokes. It's a simple textured Round brush that has Color Dynamics turned on to produce some different colours. It's useful for early block-ins because it gives me textures and random colours at the same time.

#### RECTANGLE TEXTURE BRUSH



This brush is ideal for rendering and detailing. It creates unique, blocky brush strokes that fit well with my own style. I often use this one for final touch-ups.



## 9 Sculpting characters

Now that I've got a solid foundation, I start to think about the basic anatomy of the characters and fabric details. I focus on getting the right forms and planes. To do this properly, I look up some fabric and human face references and even strike a pose myself to achieve the look I'm after. I regularly turn my drawing layer on and off to check that I'm on the right track. From this point on, artistic decisions are being made.



## 10 Applying visual noise

Rendering is all about getting the right shape, hue, value and texture, so I came up with the idea of throwing in textures earlier in the process. I grab a concrete texture and apply it to my painting. The texture helps to move things along, especially with Gollum's forehead, which already feels good to me.



## 11 Signalling a range of surfaces

One of the most important things in the detailing process is indicating different materials. I know Frodo's sleeve should feel like a thin, soft fabric, so I soften the shapes and folds. I also want to take advantage of the torchlight to indicate the thickness of the fabric, or in this case, the translucency on Frodo's left cuff. Eyeballs are fun to paint, because they're not only focal points but also complicated surfaces – they're glossy, clear spheres. I make sure the opposite half of the pupils, away from the light, are lighter than the other half, because light penetrates the pupils and brightens the inner surface. Frodo's ring and leaf accessory will bring another level of detail. I set my Brush mode to Color Dodge and paint highlights, because it gives me a promising highlight quality.

### Shortcuts

#### Load selection

Ctrl-click layer (PC)

Cmd-click layer (Mac)

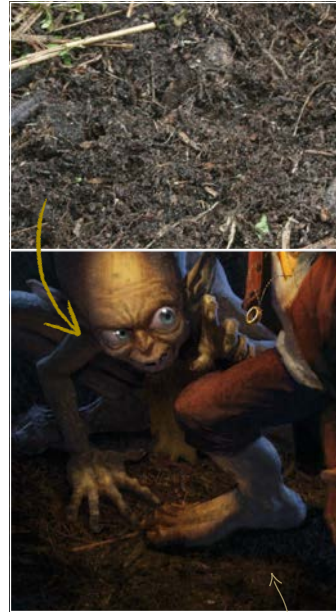
Use this shortcut to load selections from layers.

Useful when painting a specific area.

## PRO SECRETS

### Constant value check

To me, value is the most important aspect of your art that you need to understand. You can see an image without colour, but not without values. When I produce a solid value structure, colour comes naturally. When I can't see my problems but know that something's wrong, I always check my values because they simplify my image, and simplicity helps me identify my problem. I make a Color layer and fill it with black for my value checker. I put it on the very top and check my values whenever I need to.



## 12 Photo realism

The forest ground has many layers of detail and I'm failing to capture those rich details, so it's time to use a photo texture. This time the purpose of my photo collage is to preserve the photo's details to produce a realistic texture. So the integration method should be different. I usually put on a slight Blur filter and gently paint in some darks, extra leaves and dirt to achieve this.

## 13 Visual effect

Now that I'm in the final stages of the piece, I make a colour correction and add a camera effect. From the beginning, I've been using the lighting concept from the filmmaking process so I think of my piece as a movie still. After the colour correction is done, I blur some edges and sharpen others to emphasise the focal point. A light haze around the fire and a few subtle sparks are also added.



## 14 Final touches

I have a rule to finishing a painting. I try really hard to ignore my piece for a while, to evaluate my painting with fresh eyes. Only by doing this can I identify any mistakes. I notice Gollum's pose could be a little bit more gestural and Frodo's facial expression has some issues. So I change their poses slightly and add some fine details, such as dirt on their bodies, buttons and the sword. Finally it's done. ●



## PHOTOSHOP

# DESIGN A SET FOR ANIMATION

**Mingjue Helen Chen** applies her knowledge of art direction to design and stage a distinctive animation environment

**W**elcome! This workshop won't only outline the basic way to start a set design, but also introduce the thinking behind set design for animation.

One of the most important aspects of any set in animation is the fact that it should work as a stage for the characters and story, as well as any action that takes place within it. When you look back at some of the classic feature film animations, you'll notice that each frame is designed so that it contains the best composition to tell the story. Your set design should be no different: it should first and foremost be designed for the camera and story.

I find the easiest way to begin is to imagine a scene or actual shot from the final film with a strong story point, and stage it in the clearest

way possible. Afterwards, you can reverse-engineer the actual design of the set and props.

As a visual development artist, a large part of the job is being able to visualise what the film could look like aesthetically, using techniques such as lighting, texture and stylisation to get that vision across. Another big consideration that relates specifically to film versus traditional illustration is the time the audience has to digest information. In an illustration, the purpose is to capture the viewer's attention for as long as possible, to elicit their appreciation of small details and paint strokes. However, in film the viewer has only a limited amount of time to digest the visual information put forth by the camera in a shot. Essentially, every second counts!

### PRO SECRETS

#### Painting your lighting effects

When lighting an object, I prefer to paint the light into it and then add layer effects such as Color Dodge afterwards to enhance the effect. My basic approach is to start on the object with basic lighting built in, use an Overlay/Dodge layer with the colour of the light I want to use, and then create a new layer for any required effects such as bloom.



### 1 Produce some thumbnails

To start, I decide on a simple story – one that's easy to read and a fun jumping-off point. A lonely girl spends her time in the attic of an orphanage or a foster home, and it's here she meets another inhabitant of the attic. This simple story provides just enough context to get going on a set. I usually produce four or five thumbnails to get things going.



### 2 Research

Next, I spend some time seeking out references for different aspects of the painting; these can be photographs of the actual space, props or even lighting. By the time I start looking for reference I've already made some key decisions about the piece, such as the fact that I want the main light source to be warm candle light.





## Artist PROFILE

**Mingjue Helen Chen**  
COUNTRY: US



Helen works as a visual development artist and art director in

the animated feature film industry. Films that she's been involved with include Frankenweenie and Big Hero 6.

<http://ifxm.ag/mh-chen>



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### 3 Deciding on a thumbnail

I chose a thumbnail in which the characters stand out from the supporting background. I also decide on the setting of an attic because it has a lot more visual interest than an ordinary bedroom, because of the shapes created by the dormer windows.

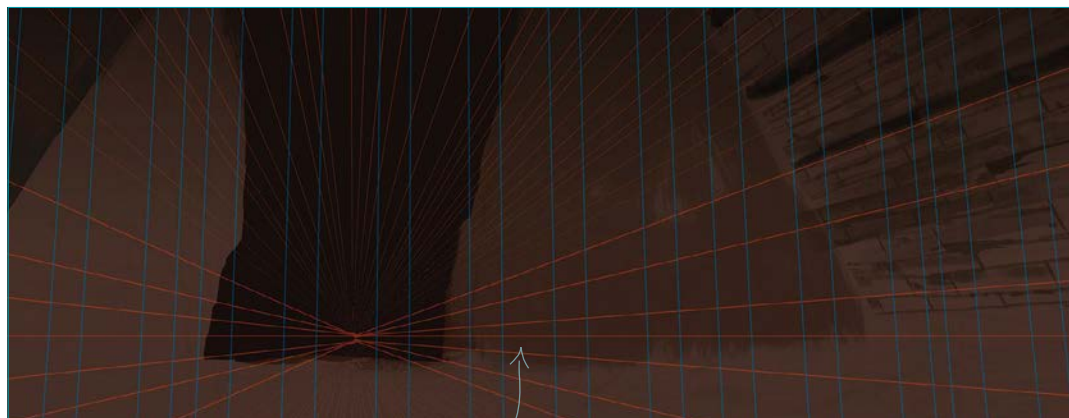


### 4 Laying in the space

This is the most important step for me, because this is where I lay in the key planes of the set, as well as the initial lighting. It determines not only the size of the space, but how dark or light the final piece will be. Every stroke I make afterwards will be judged against the values and colours of this first layer of paint.

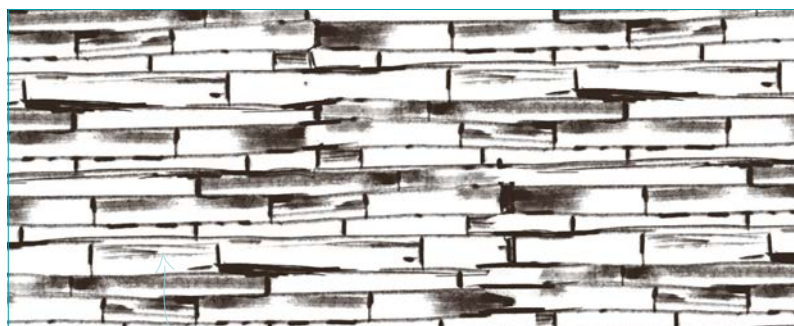






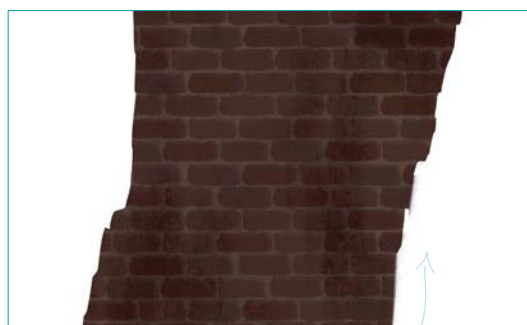
## 5 Set up your perspective grids

I don't often rely on perspective grids: if I follow them too closely, I find the end result looks too stiff for animation. I do lay them in early, though, so I can look back and remind myself of what perspective I think the piece should be. The decision of what perspective to use has already been determined in my loose thumbnail.



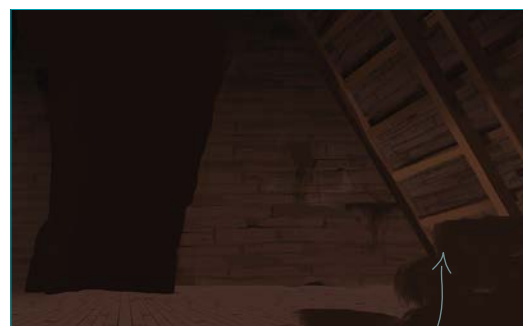
## 6 Creating your own textures

I tend not to use photographs in my paintings, because they rarely look correct next to the more cartoony characters. So for repeating patterns and textures, I've started to find ways of creating my own. The danger in this, though, is too much repetition, so I make sure things aren't too even – for example, the widths of the wood.



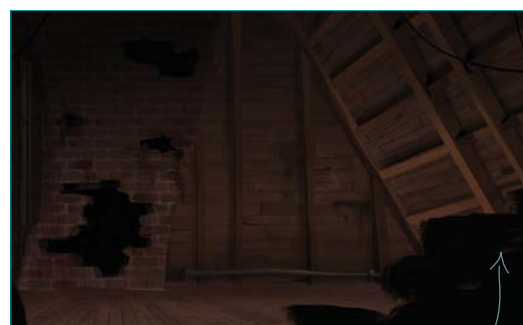
## 8 Painting the chimney

I repeat the process of creating my own texture for the chimney. I move it on to a new layer so I can focus just on the chimney. Once I'm happy with the result, I move it back into my original file and adjust the lighting to match the rest of the image. Using a combination of Multiply and Darken layers gives me a pretty good result.



## 7 Laying in your textures

Next, I apply texture along those large planes of the set I established early on. I regularly pull up my perspective grid to make sure that it follows it, more or less. I often use these textures in a layer mode such as Multiply and adjust the Opacity. It's important to paint over the laid-in texture, because otherwise it'll look like a flat texture that's been overlaid, funnily enough!



## 9 Adding architectural details

At this point I have my "stage" designated, so I start painting elements like the crossbeams with my lighting scheme in mind. The human brain tends to want to equalise things, but to give this attic the feel of a little wear and tear I change up the spacing between the beams. It also creates interest within the design, because not everything is perfectly spaced.

**RESOURCES**

**WORKSHOP BRUSHES**

**PHOTOSHOP**

**CUSTOM BRUSHES:**  
**006OILPASTEL**

I use this flexible brush as a quick sketching brush, and for depicting nice, crisp edges.

**THICK\_ACRYLIC\_ULTRA\_TEXTURED**

This is my main painting brush. I use it to produce a textured painterly base on every painting I do.

**LIGHT\_THICK\_PAINT**

I use this brush for its neat vertical and horizontal texture. It's ideal for creating a subtle wood grain texture.





## 10 Time to redraw!

Now I take my image and recompose smaller details back on top of it, such as the characters and a few prop details. It's always hard to know how much detail you need to put into a painting, and for the first step of a set design like this painting, I think something that conveys the feeling of the space rather than every little detail is more important.



## 11 Illustrating some props

Keeping with the main value structure of the piece, I paint details such as the foreground elements and the small trinkets that the character might have put up in her space — newspaper clippings, feathers, glass, for example. I want to show that she's taken this empty space and made it her own. If this set were to go to final, these props would warrant their own design pass.



## 12 First character

Now I lay in the first character. She should be clearly visible among the darkness and all the little trinkets that she's put up, so I make sure she's one of the brightest points in the painting. I also create a cast shadow of the character to accentuate her lighter silhouette against the darkness that the shadow creates. This also helps to push the smaller details back.



## 13 Second character

This second character is tricky, because of the idea that she isn't just a human. I chose blue to contrast with the warm lighting on the human character, to pull them completely into different worlds and to keep the painting from feeling too monochromatic. I use a variety of blurs, Gaussian and motion to help give her a glow.



## 14 Lighting effects and finish

After the bulk of the painting has been completed, I can now focus on adjusting the lighting and values for the best read. The idea is to tweak the balance of the piece just in terms of value, to achieve the clearest read. I also add a rim light to the sitting character's face because I feel she's become slightly lost in the painting, even though I've put a dark shadow behind her. Finally, I add a noise filter to tie the painting together. ●

## PRO SECRETS

### Painting rim lights properly

One of the biggest mistakes I see when painting rim light is when it presents as a flat line along a shape. Think of rim lights as a light source that falls on top of the object and wraps around the form. Rim lighting will also be more believable if it looks like it's affected by texture and how the object reflects light. For example, use softer rim lights for objects such as wool or hair, and harder ones for metal.

## Shortcuts

### Transform tool

Ctrl+T (PC)

Cmd+T (Mac)

Quickly lay in a flat texture or use to move elements around quickly.



# 15

# WAYS TO SURVIVE YOUR DREAM JOB IN ANIMATION

Chris Oatley's visual development experience will help you to ascend the animation industry's ranks

**S**pring 2007 was when I landed my first in-house visual development gig at Disney. After a few months of eye-opening experiences at the studio, I felt compelled to create the podcast that I wish had existed when I was trying to break into the industry.

Over the past eight years, eight animated films and a hundred podcast episodes, I've been helping artists make the transition from total noob to experienced pro. In that time,

I've observed a few common mistakes and misconceptions that could sabotage your animation career before it starts.

Even if you feel like a total noob (I often still do), no one has to know. You can – and should – begin preparing yourself to work in a studio environment long before you break in. Here are 15 ways to ensure that you look, sound and feel like a confident professional on your first day at an animation studio.

## Artist PROFILE

Chris Oatley  
COUNTRY: US



Chris left Disney in 2012 to start The Oatley Academy of Concept Art and Illustration. His ArtCast features education and career advice from some of the industry's top professional artists.

[www.chrisoatley.com](http://www.chrisoatley.com)



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## 1 You're probably stopping too soon

At Disney, I would spend three to five days on a single character design and then another week on the visual development painting. Sometimes during that process, we would decide to scrap everything and start over. It's rare for me to meet an aspiring artist who

works this hard on a single character design or digital painting. I know that almost every artist on the internet is in a huge rush to churn out as many paintings as possible, but this isn't a race. Well, it is a race, but have you ever heard the story of the tortoise and the hare?





“Try to understand how the synthesis of visual elements defined the art direction of successful animated films”

## 2 Become a chameleon

As an animation visual development artist, you'll have to adapt your work to the style of a particular film or TV show. You'll also face many design challenges that aren't covered in the style guide. Study the history of design and watch every director's commentary and "making of" documentary you can find. Try to understand how the synthesis of visual elements defined the art direction of successful animated films such as *Sleeping Beauty*, *Mulan* and *The Incredibles*. Doing so will increase your artistic agility, and develop your versatility and your unique visual voice. ➔







### 3 Draw and paint the real world

You can't hide a weak drawing using shiny digital techniques. True professionals will see the stiffness in your figures and the mushy perspective in your environments. Regardless of your skill level, it's crucial to paint from real-world observation. You can always find figures and environments to study for free. Paint en plein air. Draw the animals at the zoo. Sign up to life-drawing sessions. Get your art buddies to pool funds and hire a model, or save your money and pose for each other.



### 4 If it looks wrong, then it's probably wrong

Legendary painting guru Richard Schmid said: "Never knowingly leave anything wrong on your canvas." If something in your drawing or painting looks "wrong" then don't move on until you figure out what the problem is and fix it. Don't ignore the problems in your paintings. They won't go away with more rendering. They'll only get worse.



### 5 Create your own "tradigital" techniques

Most of the artists at Disney work tradigitally, meaning they move back and forth between traditional and digital media. All of my character designs begin in my sketchbook and then I scan them into Photoshop or SketchUp or both to explore further. I then print the digital version and draw over it with pencil or marker or colour it with marker and coloured pencil. Then I scan the hybrid image and finish it digitally. Keep changing things up to keep it interesting.

“ Make the most of every opportunity to prove that you're an indispensable asset and a worthy addition to the A-Team ”



### 6 It's hard out there for a temp

Breaking into animation is often like dating someone with a fear of commitment. Your first few gigs might feel uncomfortably impermanent, and that's likely because the studio is still unsure about the financial viability of investing in a long-term relationship with you. This happens to almost everyone. Don't let it mess with your head. Make the most of every opportunity to prove that you're an indispensable asset and a worthy addition to the A-Team. I found Linchpin by Seth Godin ([www.sethgodin.com](http://www.sethgodin.com)) a great read for learning how to become indispensable.





## 7 Be inventive... up to a point

Your work must be inventive and stylistically versatile. But you also don't want to stretch so far into versatility that you begin to showcase your weaknesses. Cory Loftis (pictured above) is a great example of an artist who maintains a balance between consistent quality and mind-blowing versatility, as his blog demonstrates: <http://coryloftis.tumblr.com>.



## 9 Meet the professional geek

The animation industry is full of geeks. Our cubicles are adorned with toys and most water cooler conversations sound like film school, but every successful animation pro has found their zen. They carry themselves with friendly confidence and engage in compelling, adult conversations. They aren't presumptuous and are good at reading social cues. Their colleagues feel both challenged and respected. Many aspiring artists haven't found the balance between geek and professional. Spend time with older, wiser professionals from any industry and practise the art of conversation.



## 8 Under-promise, then over-deliver

When passionate artists get excited about a new creative opportunity, they often promise too much, become overwhelmed and end up having to apologise for unmet expectations. As my friend Mike puts it, this is "writing cheques with your mouth that your body can't cash." I'm especially guilty of this. It's a hard habit to break. When freelancing for a studio (an opportunity that often precedes full-time work) or following-up with a recruiter or art director, always promise less than you know you can deliver by the deadline. When you deliver more than they expected, you'll seem like a superhero.



## 10 Feed your head

Creative ideas come from knowledge. Knowledge comes from history, past and present. A deep knowledge of art, film and literary history will fuel your imagination and help you to communicate efficiently (and impressively) with your directors. If it'll make you smarter, read it. ➔





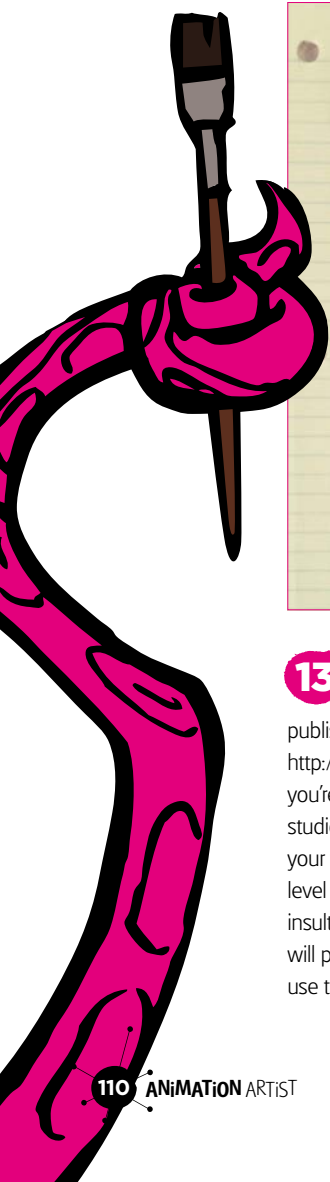
## 11 Hit the ground running

Some young artists break into Disney and start dilly-dallying. One of my younger colleagues dropped by my cube for up to an hour, multiple times a day. This artist didn't get the "not-removing-my-headphones" message, so we eventually had to have an awkward chat. Yes, you need to make connections with your colleagues, but every minute of the job is an audition for the next movie or TV show. Play hard if you like, but during working hours the idea is to work hard.



## 12 Prepare to be unprepared

Everyone on the crew has too much to do. When something goes wrong, the producers look for the most convenient, viable answer... and that might be you. After you break in, it probably won't be long before you're asked to solve a high-stakes problem, or at least contribute to the solution. Stay cool. Trust your talent and training. And don't let them down.



## 13 Negotiate a fair rate

The Animation Guild (aka "Local 839") in Burbank publishes a yearly wage survey for the animation industry: <http://animationguild.org/contracts-wages>. Refer to it when you're submitting your salary requirements to an animation studio in southern California. Your starting rate is crucial because your future pay raises will probably build upon it. Note the entry-level rates as well as the ceiling to negotiate a fair rate without insulting your potential colleagues. While studios in other cities will probably pay a little less than studios in LA, you can still use the survey as a basis.

“After you break in, it won't be long before you're asked to solve a high-stakes problem, or at least contribute to the solution”



## 14 With great power...

Artists and storytellers have an extraordinary ability to cultivate empathy in the world. Much of the pain we experience is caused (or severely intensified) by a lack of empathy across cultures, creeds, clubs and between individuals. Yes, I want you to pursue mastery of the craft and success in your creative career with wholehearted passion. I want you to get your dream job. I really do. But I want you to consider a higher calling, too. How can your art help to heal a relationship, humanise the oppressed or awaken selfless love in your audience? Why not try?



## 15 The long haul

A successful career in animation goes way beyond your portfolio. Inside the studio, your primary job isn't to be the best artist on the crew. Your primary job is to make the lives of your art director, producers, director and crew as easy as possible and contribute to the group result. Of course, that means being a solid artist and taking art direction. But it also means being a humble listener, a trustworthy collaborator, a clever problem solver and a generous encourager. I hope you're up to the job! ●





## PHOTOSHOP

# HOW TO RENDER CHARACTERS

Discover how you can make your 2D character designs look like 3D models. **Pramin Phatiphong** is your guide

**F**ixing colours, size, character poses, format and rendering styles will be some or all of the things that you'll be asked to do during the visual development process. This can be time consuming and creatively draining, even for the best of us.

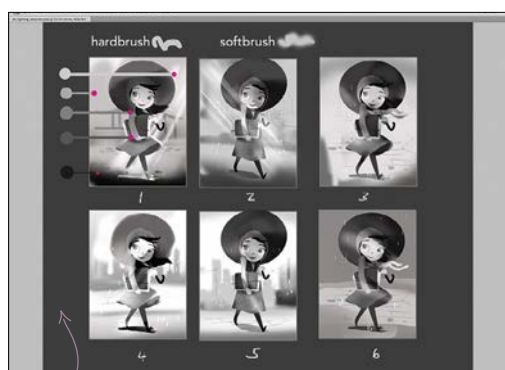
So in this workshop, I'll introduce an approach to rendering that I've used over the years to help me through many demanding production requirements. Essentially, my process covers the rendering of a 3D look in

2D. This is a time-saving method that helps the development team to clarify and define concepts before the character or asset is submitted to modelling, which is a lengthier and more costly process, and more difficult to correct at a later date.

My approach adopts a relatively non-destructive method of rendering, which makes use of many layers along with the Pen tool. It requires some time to set up properly and this might seem counter-intuitive, but spending the

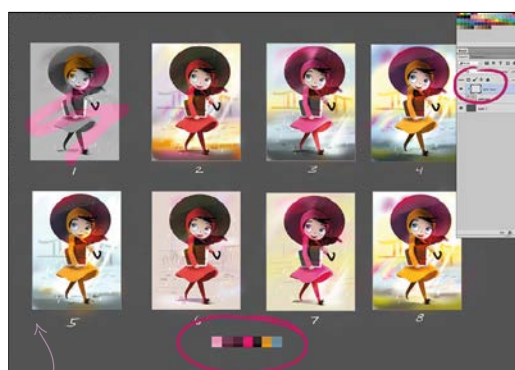
extra time in establishing your graphics upfront will give you the flexibility to deal with most production demands that raise their heads during the latter part of the process.

Staying organised, naming layers logically and creating context folders will give you back more time for higher levels of creative thinking and execution. Finally, knowing the basics of 3D lighting or just plain cinematic lighting will always come in handy, whatever the assignment.



### 1 Conceptualising the composition

The brief calls for a young, hip urban girl with artistic dreams, so I draft up some black-and-white thumbnails to work out composition ideas as well as story and mood. I create between six and ten thumbnails, using no more than three to five basic value planes with a simple Hard brush, plus a Soft brush to create various lighting schemes.



### 2 Colour test

I take a single thumbnail and make eight copies of it on a single layer. To colour it, I create a separate layer using the Overlay layer mode. I use as many layer modes (Color, Multiply and Screen) as necessary to achieve the right effect. It's always better to paint in the effects, but having a command of layer effects will help you stay flexible for production demands.

### Artist PROFILE

**Pramin Phatiphong**  
COUNTRY: US



Pramin is an Los Angeles based art director and concept artist

working in animation, advertising, print and mobile. He's an all-round ethical chap with good table manners.

<http://ifxm.ag/praminp>

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### *Shortcuts*

#### **Resizing Brush**

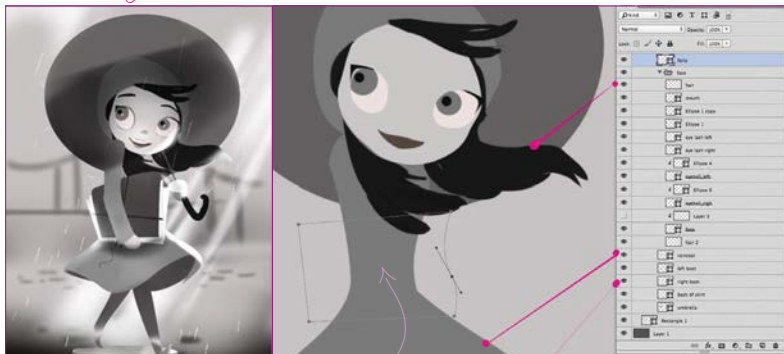
**Ctrl+Opt (PC)**

**Cmd+Opt (Mac)**

Hold these keys down  
while dragging your stylus  
left or right to quickly  
alter brush size.



Thumbnail image



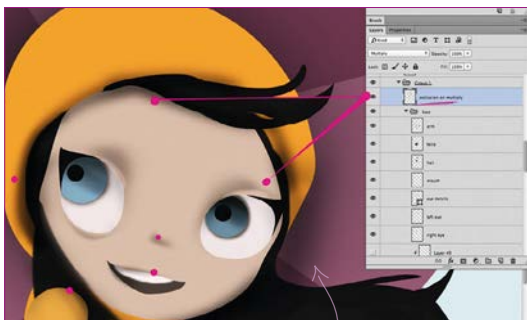
## PRO SECRETS

### Get to grips with the Pen

This Photoshop tool might be one that most concept artists avoid, because the drawing feedback doesn't feel as spontaneous, and it's also fairly cumbersome to use. But with a day's dedicated practice, a working knowledge of the Pen tool can add greater precision and the speed you need to your creative arsenal.

## 3 Blocking out shapes

Once I'm satisfied with the colour scheme, I take the small black-and-white thumbnail and enlarge it with the Transform tool to the desired size. Just as if I were using tracing paper, I use the Pen tool to create shapes for each character part – face, eyeball, hair, legs, mouth and so on – over the enlarged thumbnail. As I do this, I make sure the values match those of the original.



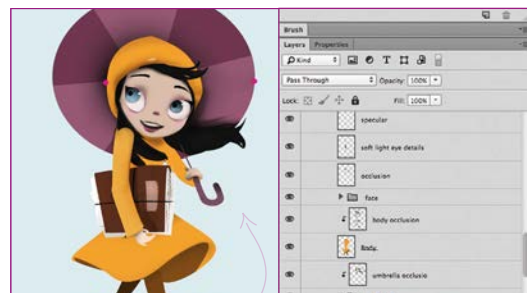
## 4 Colour fill

Next, I colour each part by sampling the colour test thumbnail. Double-clicking the shape layer brings up a Color Picker window, and I use the Eyedropper tool to find the target colour in the thumbnail. I pick a half-tone from each plane. Whether creating shapes or colour, I prefer to use a non-destructive method when possible. This gives me options during my painting phase.



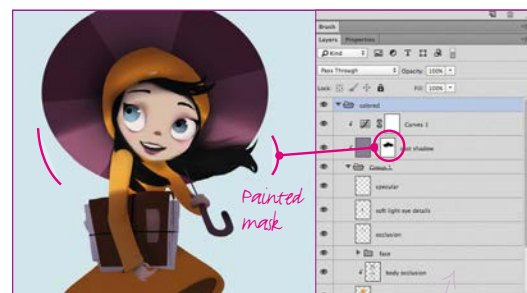
## 5 Ambient occlusion

This is generally a 3D term. Put simply, it's the innermost area of the painted object where it's darkened by shadow. I use a Clipping layer with a Multiply setting to start painting in shadows (not cast shadows) in areas where there's a recess – for example, the fold of the eye, the mouth or the clothing. I use black and set the layer's Opacity to between 60 and 70 percent.



## 6 On to the face

After applying ambient occlusion, I create a Soft Light mode layer and apply several colour accents to bring out the iris, cheeks and lips. Soft Light is one way to make the image pop with subtlety, but enough to create a strong focal interest. Of course, applying a nice specular shine to eyes at either the 10 o'clock or 2 o'clock position of the iris is a safe bet.

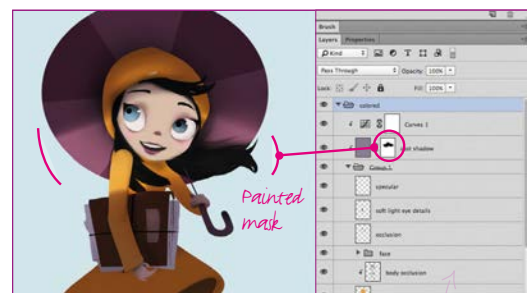


## 7 The big picture

At this point, I back up and assess the overall picture. I applied Soft Light or Overlay layer effects to the entire body to balance the composition, making sure the colour accents serve the focal point. I made the rear leg darker and brought up the occlusion behind the head to add more depth. I also add some graphic and textural elements to the umbrella.

## 8 Adding a cast shadow

Now that all the pieces are prepped, I introduce a dramatic cast shadow on a Clipping layer. Using a purple colour fill, I set the layer to Multiply. I then create a mask to erase off the part that represents light dawning on the face. A Soft Round brush gives me flexibility in handling the cast shadow edges, because they vary in softness.



## RESOURCES

### WORKSHOP BRUSHES

#### PHOTOSHOP

##### CUSTOM BRUSHES: SOFT ROUND

This brush is great for painting planes that require gradients, and for blending edges or colour transitions.

##### MED ROUND

Ideal for laying down colours and broad strokes. It's usually the first brush I use for the bulk of illustrations.

##### HARD ROUND

This brush gets the least amount of use, but it's extremely helpful when I need to create a vector-like stroke quickly.

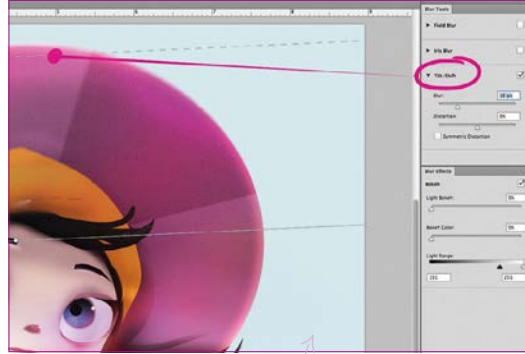


# In depth Render characters



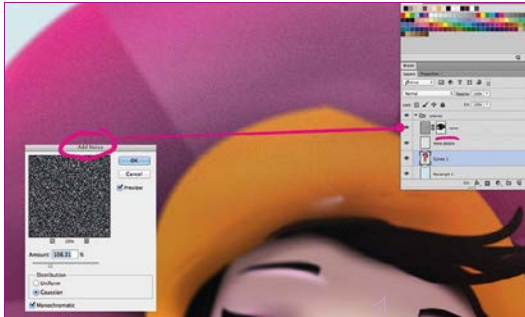
## 9 Lighting accents

After some degree of adjustment, I merge all the layers and save as a new file to declutter my workspace. I create another Clipping layer and set it to Vivid, sampling the base colour to paint lights in. Vivid mode works rather well for a high-key composition such as this one.



## 10 Adding blur

Next, I add a tilt-shift effect to create shallow focal length to add intimacy to the character. In essence, the blurred edges force the viewer to look at the in-focus area. The degree, position and size of blurring is a matter of preference. Whether hard painted or added by effects, blurring helps to add a little mystery to the piece.



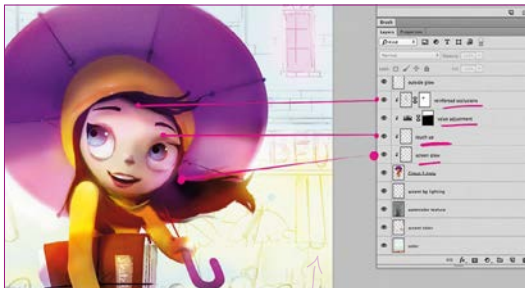
## 11 Apply some noise

Next I use the Add Noise effect to mimic film grain, as well as distress the image further. This is done by applying a colour fill on another layer, usually black. I apply Add Noise to this black-filled layer and then set it the layer to Overlay. I adjust the Opacity to create a subtle effect, and use a Soft brush to mask off areas where I don't want the noise until the desired effect is achieved.



## 12 Background elements

The brief requires the background to be simple, sketchy and sparse, so that text can be added when the image goes on the cover. On a separate layer, set to Multiply, I apply a light-blue fill, then scrawl a few architectural details that suggest a Parisian setting. I also paint some lighting overlays to the background to further frame the character.



## 13 Adjust values

All the heavy lifting has been achieved by playing with shadow and colour. I use Adjustment layers to tweak the levels and saturation for optimal readability, and create more details to fill in the compositional gaps, such as occlusions, paint splashes and colour droplets. I warm the image by adding a watercolour texture to the background.



## 14 Conclusion

A lot of the initial work was done to anticipate iterations of the image. Creating all the assets using a non-destructive process means that readjusting lighting, saturation and even pose or expression is straightforward. This technique adds speed and control to my workflow. You can, of course, use Illustrator as a substitute. ●



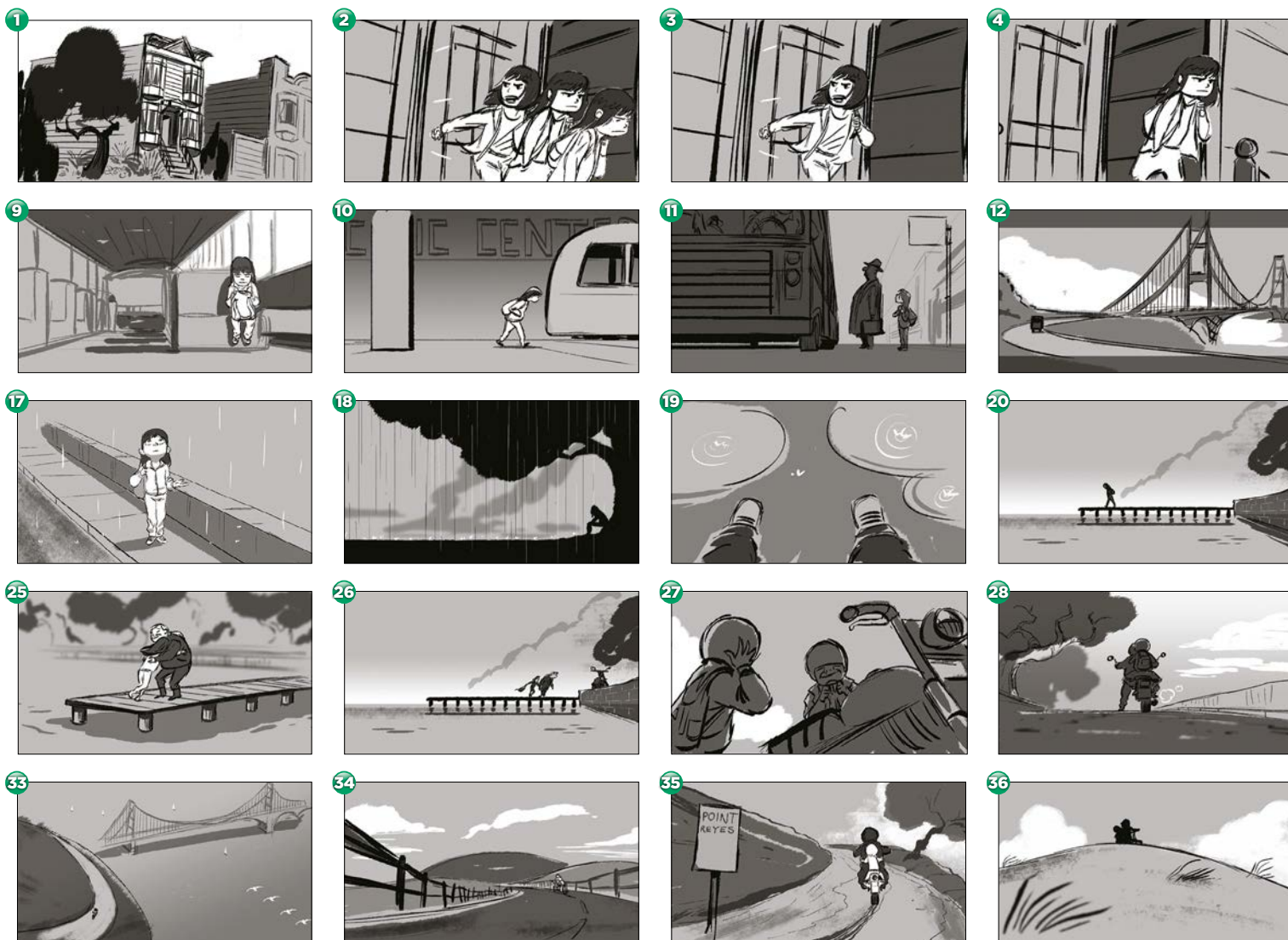
*Shortcuts*  
Layer selecting  
from the canvas  
**Ctrl+click object (PC)**  
**Cmd+click object (Mac)**  
Helpful when navigating  
to paint on different  
layers.

## PRO SECRETS

### Purge the clichés

Be bold and crank out as many thumbnails as the schedule allows. Don't pause to criticise. No one has to see your less-favourable creations. This is an exercise to purge any clichés that are inside you. Your creative muscle has a warm-up point and needs to be stretched to improve, if you're to see decent results.





## ARTIST INSIGHT

# THE ART OF STORYBOARDING

**Matt Jones** passes on his industry experience for honing your storyboard craft – a key skill for any animation project

**D**uring the early months on Pixar's *Inside Out*, I gave myself a personal assignment to draw a sequence from the point of view of an adolescent girl running away from home after an argument with her parents.

I had recently moved to San Francisco from the UK and based the sequence on my exploration of the Bay Area. She followed a path across the Golden Gate Bridge through Sausalito, Marin and up to Point Reyes lighthouse – the edge of her known world. I could see a


parallel with the interior story of the Emotions lost in the Mind (at the heart of the film).


I was trying to find symbols that could have corresponding interior imagery: the lighthouse as a beacon of joy, the Golden Gate Bridge spanning two worlds, the fog that hangs above Twin Peaks.

I drew the sequence rapidly in a flurry of inspiration, on paper, but then lost the originals. I've recreated the sequence digitally, taking more care over the drawing. They're 'beat boards' – single panels to represent a scene. ➔

*Artist*  
**PROFILE**

**Matt Jones**  
LOCATION: US

 Matt has worked in the animation industry for over 20 years and storyboarded for major studios including Aardman and Pixar. He's currently in Los Angeles developing projects.  
[http://ifxm.ag/m\\_jones](http://ifxm.ag/m_jones)

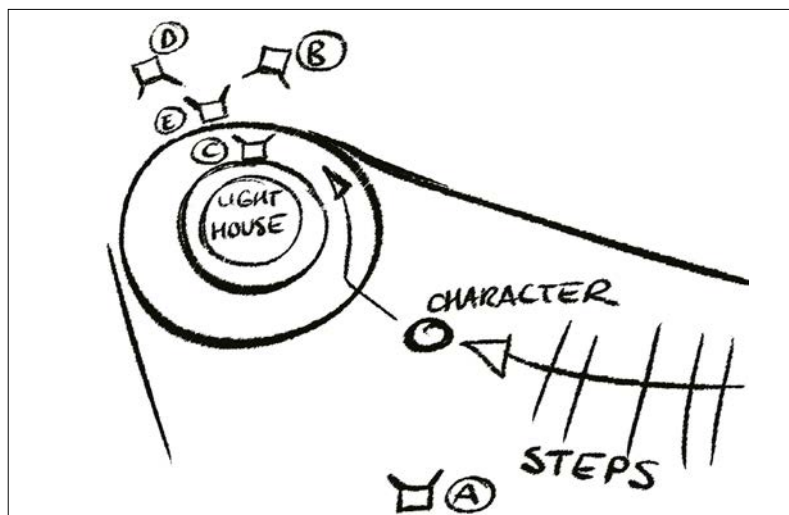
 **GET YOUR RESOURCES**  
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# Artist insight The art of storyboarding







## 1 GETTING STARTED

Faced with that first blank panel, where do you begin? Well, think! Read the script pages multiple times and visualise the sequence in your mind. Start sketching key images or shots you think are integral. It may be an establishing shot of the location or the height of the emotional beat of the scene. For a complex setup with multiple characters moving around, a good idea is to draw a map with camera placements to stay on track.

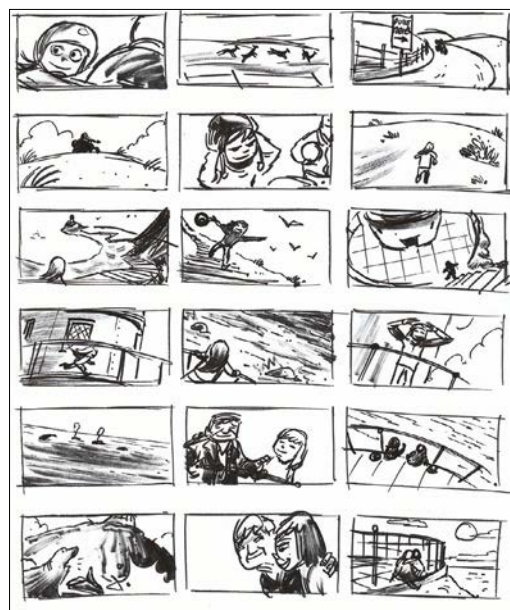
“The orientation of the face towards the camera can determine the level of empathy the audience feels”



## 3 STORYBOARD BASICS

Contemporary feature animation boarding usually requires several panels per shot. For instance, if a character is moving out of frame from a standing position you would have an A pose (standing), a B pose (walking out), and a C pose (gone). For the purpose of a smooth animatic the editor might demand some in-between poses, for example, an anticipation pose, before the walk and a half-out

pose as the character exits the frame. This is where modern storyboarding converges with old-school 2D layout and even approaches animation. It depends on the wants and needs of particular directors and editors, but often story animatics or story reels feel animated. They may be roughly drawn but are so fleshed out they feel animated, which helps the audience read or follow the story.



## 2 GET THUMBNAILING

Thumbnail sketches are 'thinking' drawings and help me quickly work out the staging and acting of a sequence. I won't start a sequence until I've fully thought it through and know where I'm going with it. I'll improvise acting and poses once I get into boarding, but I need this framework to support the sequence and ensure it flows with the right camera angles, moves and cuts. I usually thumbnail on the script page, roughing out compositions and circling lines of dialogue with speech balloons attached to the relevant shot.



## 4 GENERATE EMPATHY

The orientation of the face towards the camera can determine the level of empathy the audience feels with that character. A figure in profile reveals less of their face, shows only one eye and therefore we see less of their emotional state (although it works for a detached or cold state). The Pixar style has evolved to have characters virtually full face with their eyeline just left or right of the camera. (The characters in Cars needed this because of their wide facial designs.)

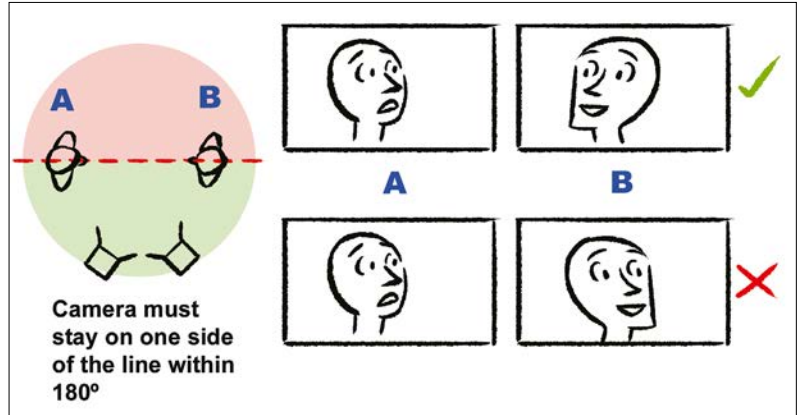


# Artist insight The art of storyboarding



## 5 OVERLAPS HELP CREATE DEPTH

Use depth to bring a more cinematic quality to your panels. You can define space in two dimensions by having characters at different scales within the frame, or overlapping them to delineate size differences. Use overlapping objects and architecture too. Characters advancing to or receding from the camera also give the illusion of 3D space.



## 6 MAINTAIN EYELINES

Screen direction must be adhered to. If character A is talking to character B then A must face B and those eyelines should be maintained. Character A shouldn't be looking in the same direction as character B when they're talking. If both characters appear to look screen left then one of them has broken the 180-degree line, and the viewer will feel they're no longer addressing each other.



## 7 BUILDING TECHNIQUES

Story artists should not only be good at tackling character expressions, but must also be adept at environments, the backgrounds of storyboard panels. Sketch from life and familiarise yourself with different architectural styles to build a mental library of designs. Study principles of perspective and use it to dynamic effect in your boards. Low or high angles on buildings tend to look more cinematic.



## 8 BODY LANGUAGE

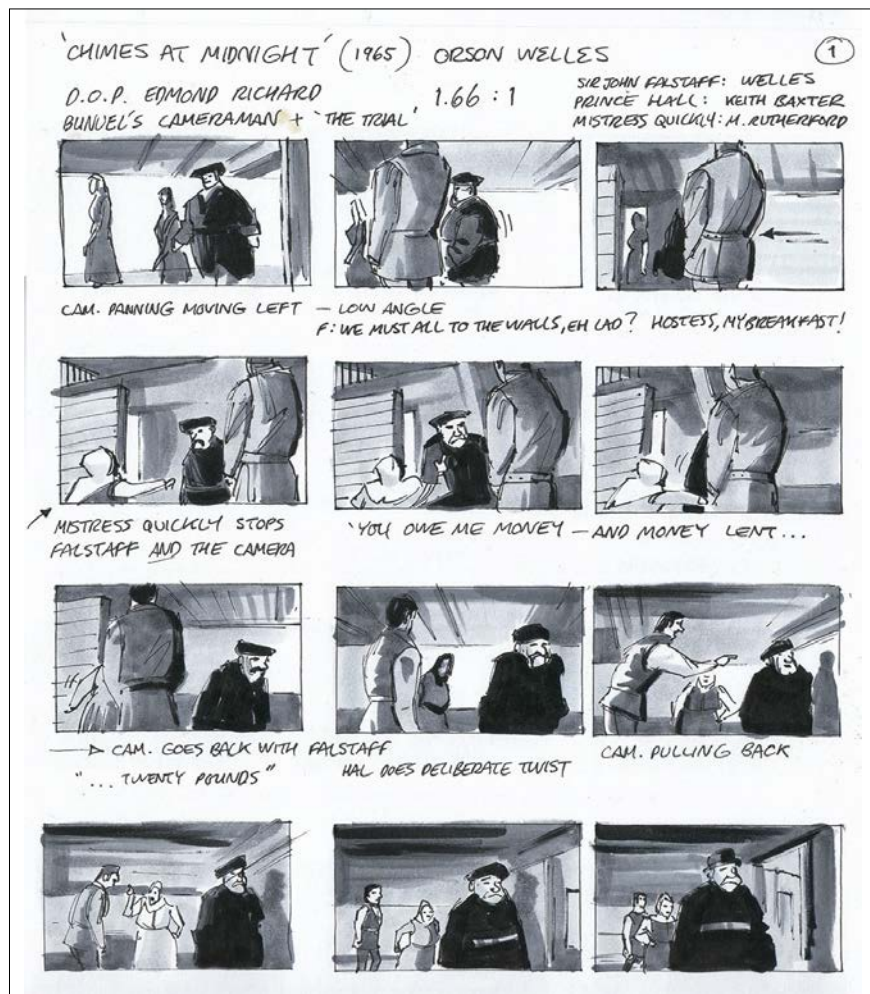
I love to tell stories visually, with as little dialogue as possible. It's the unique power of cinematic storytelling and I relish the challenge of communicating narrative through drawing alone. The drawing above became an exercise in expressing emotion through composition, framing, body gesture and facial attitude. Try testing yourself with a similar challenge.



## 9 MAKE GOOD USE OF LIGHTING

I like to indicate lighting to add a sense of mood and tone. To do this quickly (story artists must work fast these days to hit short deadlines), I start all story panels on a grey background, from a template. I use lighter greys for skin tones, white to highlight eyes, clouds, teeth and dark greys to balance and black for contrast. (This means a white background can be used, for startling effect, when required.)





## 10 AIM FOR INTERESTING STAGING

Dialogue scenes don't have to be characters standing around. Decide if it might serve the scene better to have them move around. The staging can help you express who has the power in a scene – who is dominant. Power can shift within a scene or a shot as characters become small or large elements within the composition.



## 11 BIG OR SMALL?

Size relationships can influence the emotions of the audience or reveal a character's psychology. A very small figure on screen can seem lonely or overwhelmed by their environment. If the horizon line is at a low angle, a character can feel dominant over their environment or heroic, even.



## 12 LEAD THE EYE

In storyboarding, you're leading the eye with contrast. The viewer's eye will instantly go to the point of highest contrast. Use white against black, in shape terms, straight against curve, or negative against positive. Our brains are hard-wired to detect contrast and it's aesthetically pleasing. Contrast is dynamic, communicative and cinematic. Don't be afraid to use heavy blacks – think like a camera operator and create drawings that feel like frames from a film.

## 13 MAKE YOUR SHOTS COUNT

Close-ups can be reserved for impact – don't make every dialogue shot a close-up. Remember, the characters are large on a cinema screen. An intimate close-up of a character's face is only really necessary for very subtle shots of emotional resonance, to show someone thinking, changing their mind, realising something, shock, surprise and so on.

“You must suppress artistic ego. The drawings are functional and disposable”



# Artist insight The art of storyboarding



## 14 THINK ORGANICALLY

Story artists must also think about how separate shots work together across a film's cut. When viewed in animatic form, shots must flow organically and also lead the eye between different compositions. If the point of interest is screen right in one shot, then the next shot should pick up that same eye position and lead it onto the next shot.



## 15 BOOST YOUR SKILL SET

Storyboard artists are the director, writer, editor, cinematographer and actor of their sequences and must be skilled in all. Reading books on these subjects is essential, but to master it you must practise it. You have to get comfortable with producing hundreds of drawings every week for the duration of a production, many months and

often years. You must suppress ego – drawings are functional and disposable. They will never be seen by an audience and sequences are routinely re-drawn or 'fixed' by others. It's the ideas that count and that make it to the screen. You must understand that filmmaking is a collaborative art form and the reward is the final film. Though there's still a thrill to be had if your gag makes it to the screen!



## 16 DRAW FROM FILMS

Analyse a scene that strikes you from a good film and sketch the composition. Then take note of the camera moves and look at how it cuts to the next scene. Learn how and why the sequence is effective. Analysing bad movies can also be productive – notice how the film-making could have been better and try to think of alternative solutions.

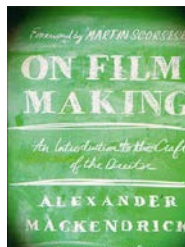


## 17 PRACTISE DRAWING GESTURES

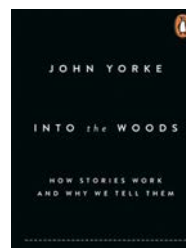
Along with cinema studies, gesture drawings are crucial. A regular session in the life class with a model striking quick poses (between 30 seconds and one minute) will loosen you up and prepare you for working as fast as storyboard artists need to. It's like the gym for your brain and arm!

## 18 FURTHER READING

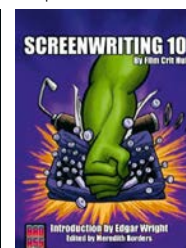
Study film, but also read. There are many excellent books on film theory and film-making. These are some of the quintessential reads:



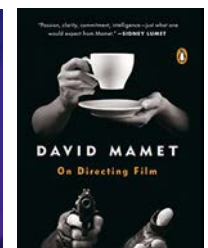
On Film-making:  
An Introduction to  
the Craft of the  
Director, Alexander  
Mackendrick



Into the Woods,  
John Yorke.



Screenwriting 101,  
Film Crit Hulk!



On Directing Film,  
David Mamet.

And anything on Sidney Lumet, Walter Murch, Billy Wilder, Orson Welles, Hitchcock and Kurosawa. Watch and study their films.





## BRUSH USE

Gandalf's beard and moustache were created using the CurveTube brush, with the SnakeHook brush used to add a pointy effect.



## PRO SECRETS

### Snakehook control

To get a pointed tip when using the SnakeHook brush, go to Brush, Curve, and make sure Accucurve is turned on. Also if you want your mesh to follow the model when using the brush, hold down Alt and it will do just that as opposed to shooting out in an arbitrary direction.

## ZBRUSH

# HOW TO SCULPT HAIR IN ZBRUSH

**Francis-Xavier Martins** shares his easy process for hair sculpting

**T**o illustrate how to sculpt hair in ZBrush, I'll be sculpting a cartoon version of Gandalf from the Lord of the Rings books. This particular model is based on a sketch by Alberto Camara. Check him out online, his work is awesome.

Fifty percent of this model is hair, and when it comes to sculpting hair, there are many ways to go about it. First, I split each section into subtools. The hair is extracted from the head, I use the Move tool to get it into position and then Dynamesh. Once I am happy with the shape, I use ZRemesher for nice even topology.

The tash is created using the CurveTube brush. Going into the Stroke menu, I am able to adjust the size, using the Curve Modifier to get it tapered.

The beard was another appended ZSphere. Because I want cuts at the bottom, I don't want too much depth.

Once I have the shape I want, I retopologise just the front part of it with the ZSphere tool and then use the ZModeler brush to Qmesh some depth into it.

The brows are the CurveTube brush again, layered on top of one another. I use the SnakeHook brush to pull out the pointy ends on the brows and the tash.

For the actual sculpting, I divide the mesh into sections with the Dam\_standard brush then use the ClayBuildup brush with LazyMouse turned on to give me some smooth, even strokes. It's important to have Backface Masking turned on when sculpting on a thin mesh so as not to pull the faces on the other side. Because this is a cartoon style, I don't want excessive details in the sculpt, so I run a Clay Polish on it, unmask and then go over it again with the Standard brush in a few areas to bring out some subtle details and catch the light.

For more realistic hair, I would use the Standard brush with an alpha and go over the model to really bring out the details. This requires a lot of patience and coffee! But in my case, I apply simple colours and my model is done.

## Artist PROFILE

**Francis-Xavier Martins**

**COUNTRY:**  
England

Francis-Xavier is a CG generalist. He has over a decade of experience in video games, media and animated TV.

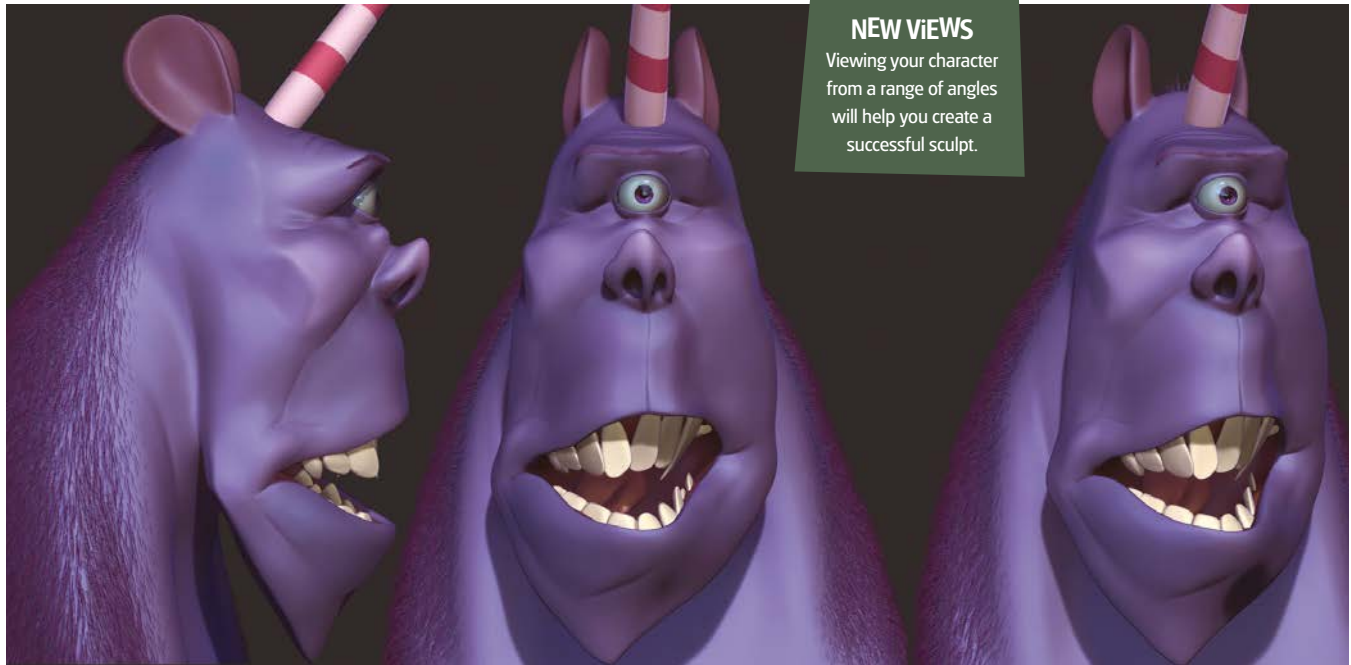
[www.polyjunky.com](http://www.polyjunky.com)



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## NEW VIEWS

Viewing your character from a range of angles will help you create a successful sculpt.

**ZBRUSH**

# HOW TO SCULPT AND POSE A CARTOON HEAD IN ZBRUSH

**Francis-Xavier Martins** reveals how to quickly sculpt in ZBrush

**W**hen I wanted to create something fun with a goofy expression, I came across a concept by Randy Bishop I really liked of a cartoon purple Orc with a horn looking confused.

To start sculpting, I use a low resolution DynaMesh sphere and block out the head and shoulders using the Move brush. When I run out of resolution, I Ctrl-drag on my canvas to remesh and get even topology.

Once I'm happy with the overall form, I use the Clay Buildup brush to sculpt in the primary forms such as the brow, cheeks and jaw. I use the Dam\_Standard brush to cut in areas for the eyelids and nasolabial fold.

It's always good practice to have a sphere for the eyes, or in this case, eye, and sculpt around it so the lids wrap around properly from all sides. Once I'm satisfied, I move to the nose, pulling out the form with the Move brush and refining with the Standard. Have fun with this process and exaggerate shapes and forms.

For the mouth, I mask out where I want it and use the Transpose tool (hit W), line up the tip of the tool in the side view, and then click on the middle circle to drag it in. I then refine the mouth with the Move Topological, Clay Buildup, Smooth and Standard brushes. The ears are done by masking, dragging and refining like I did with the mouth, but in reverse.

At this point, my model is symmetrical. In order to get it asymmetrical, I use the Transpose Master. Once I've got a workable mesh using Zremesher, I click on T PoseMesh but have Layer selected. I then use the Move tool to move the mouth, brow and nose into position.

When I'm done, I click Tpose> SubT. All the SubTools will now be in their respective poses, but, more importantly, will have separate layers so you can tweak something in symmetry if you need to. At the same time you can also go back to the posed layer and add the other elements like the teeth, tongue and horns in the expression you are looking for.

I use the Insert Sphere brush for the teeth and the Curve tube for the long horn. After a quick Polypaint, my cartoon Orc is now done, goofy expression and all.

### Artist PROFILE

**Francis-Xavier Martins**  
COUNTRY: England

Francis-Xavier is a CG generalist. He has over a decade of experience in video games, media and animated TV.  
[www.polyjunky.com](http://www.polyjunky.com)

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PHOTOSHOP

# PAINT COLOURFUL ANIMATION ART

Randy Bishop makes use of clean lines, layer modes, lighting and cloth patterns to create an illustration of a panda being given a great big hug

## Artist PROFILE

**Randy Bishop**  
LOCATION: US

Randy works as a character designer in the animation industry. He loves being able to affect how an audience experiences a story.  
<http://ifxm.ag/randy-b>



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Here I'll be going over several key concepts that I use as an illustrator. I'll be talking about rough

concepts, clean line work, colour, light and shadow, and some of the pitfalls people tend to fall into while working through an illustration. I'll be using Photoshop and talking about some of the tools that the program has and how those different features can be of help.

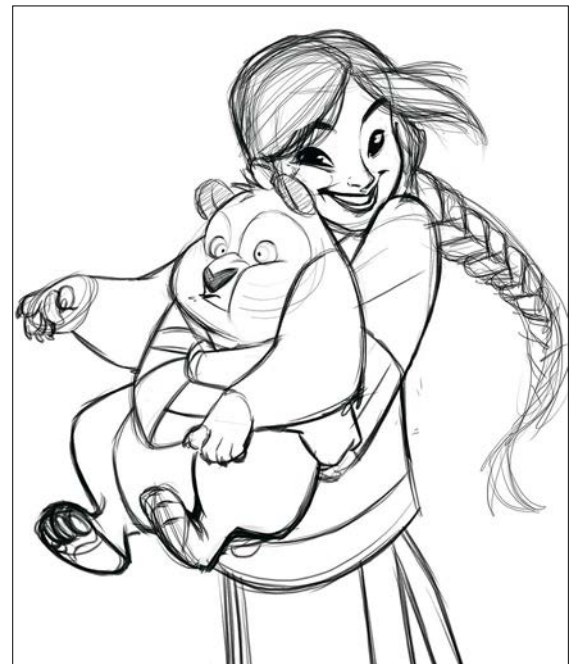


Early sketches of the panda's expressions help shape the tone of the illustration.



## 1 Coming up with a rough concept

In my experience, every good drawing begins with a solid foundation. Generating thumbnails and working through different concepts quickly helps me to clear my mind and find the best possible solution to any assignment I'm given.



## 2 Producing a refined sketch

After I've determined which direction I want to go, I dive into the details. I'm working on a separate layer from what I've done previously, and I try to work – as best I can – from large to small. Big shapes to small shapes, general ideas to details. That way I don't find myself devoting too much time to a weak drawing. ➔



## PRO SECRETS

### Facial warms and cools

Each person has a band of warmth that goes across their face from ear to ear. Ears, cheeks and noses all have a slightly warmer tint to them than the other areas of the face. The top third of the face tends to look slightly more yellow, while the bottom third of the face tends to lean more toward green.



### 3 Bring in clean lines

Inking is a process I relish. I try my best to keep the line work feeling fresh by avoiding the trap of tracing the sketch underneath. By making a conscious effort to make it feel like I'm drawing this for the first time, I'm able to retain the life that's inherent in the sketch. I use the sketch as a guide, but not as a crutch.

### 4 Laying in flat colours

On a layer beneath the clean line work, I lay down flat colours without thinking too much about the form. This comes in handy when I want to adjust the colours or values separate from each other. It's important that all of the colours are harmonious with each other before light and shadow come into the equation. Although a light source can help to harmonise any combination of colours, creating a harmonious palette to begin with makes me a better artist.

## RESOURCES

### WORKSHOP BRUSHES

#### PHOTOSHOP

##### CUSTOM BRUSHES: PAINT

This is the brush I usually use for highly textured drawings and paintings.

##### PENCIL

Has less texture than the Paint brush, but ideal for more refined sketches.

##### INK

This is the brush I use for all my inking. It has a tiny bit of texture to it.

#### BLENDER

Ideal for soft transitions. I used it for a lot of the highlights and shadows.



### 5 Duplicating and locking a layer

At this stage, I create another layer identical to the colour layer by dragging my current colour layer down to the new layer icon at the bottom of the layer menu. This can also be done by going to Layer>Duplicate Layer. I then lock the transparency of the layer by clicking the checkerboard icon at the top of the layer menu.

## 6 Filling with grey

Once I have two identical colour layers, I fill the one on top with a mid-value grey. Because the transparency has been locked on the layer, the grey only fills the pixels that are opaque, giving me a grey version of what I've already painted. This comes in handy in the next step.

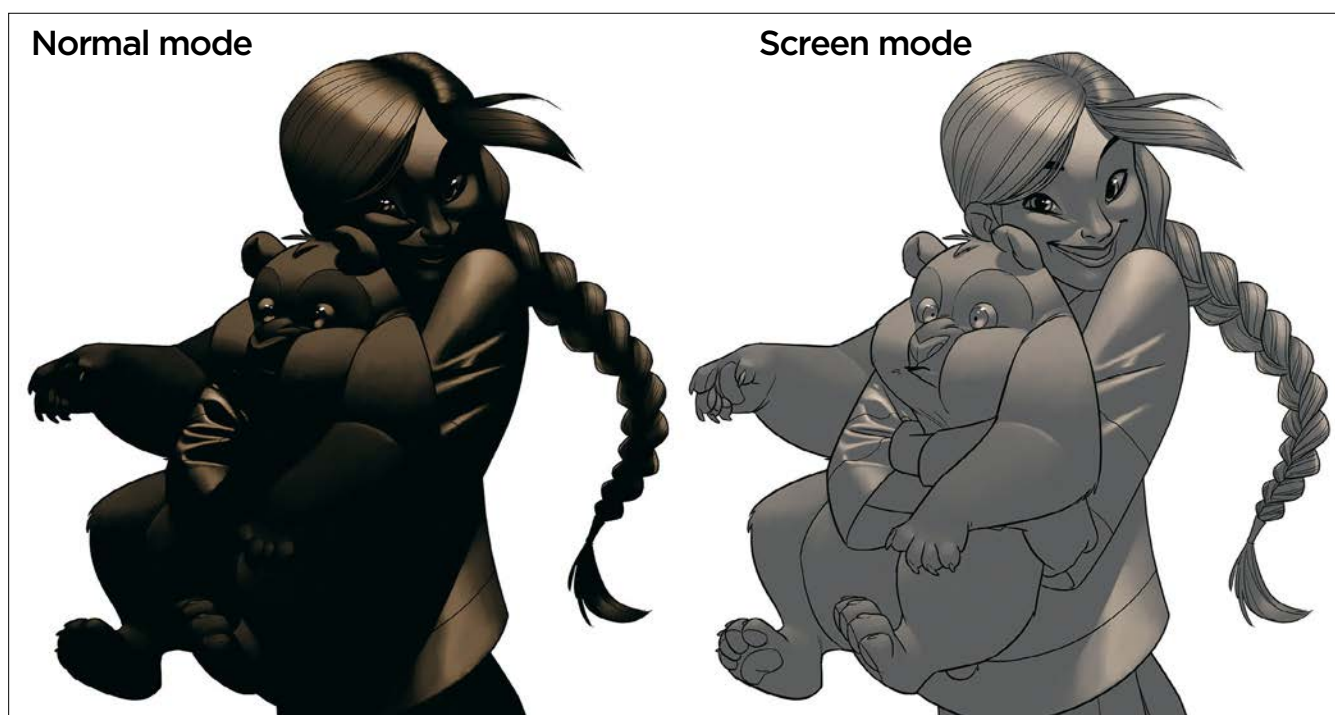






## 7 Creating shadow across the figures

I duplicate my colour layer again and fill it this time with white, then I change the layer mode to Multiply. The Multiply layer mode darkens all of the layers beneath it. White doesn't show up on a Multiply layer, but any value darker than white does. This is how I create my shadows separate from my colours. The grey layer over the colour layer enables me to think purely about form without the distraction of the colours.



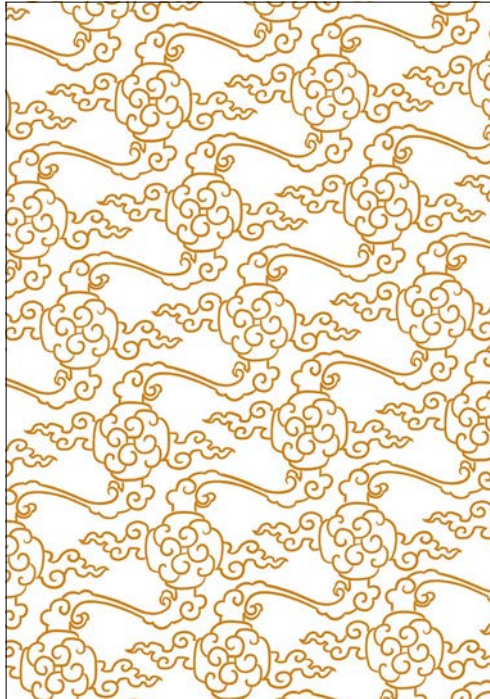
## 8 Creating highlights with the help of Screen layers

I create highlights the same way as the shadows, but rather than use a Multiply layer, I create a duplicate layer and set it to Screen mode. The Screen mode does precisely the opposite of the Multiply layer. Anything lighter than black will lighten any values on layers that are beneath it.



## 9 Thinking about surfaces

As I consider the highlights and shadows in this piece, I'm also thinking about the way the light reacts to the different surfaces. The silk dress has the strongest highlights and crispest shadows, whereas the fur of the panda diffuses the light so that the highlights and shadows are much softer.



## 10 Creating patterns

At this point, the illustration is suffering from a lack of visual texture. The girl's hair provides a little bit of a break from the solid blocks of colour, but not enough. So I design a pattern to add to the girl's clothing, based on what I've seen of traditional Chinese textiles.



## 11 Shaping the pattern to the form

To me, the hardest part of designing costuming is creating patterns or graphics that need to wrap around folds and creases in fabric. Fortunately, Photoshop has the very handy Warp tool. To use the tool, I make a selection, then hit Cmd+T, then right-click and select Warp from the drop-down menu. Alternatively, you can go to Edit>Transform>Warp. By dragging your selection around, you can conform it to all sorts of shapes. Usually, I make selections based on where there are breaks or folds in the fabric.



## 12 Creating a background

Environments are my least favourite thing to do. That's mostly because I'm not as practised with them and I'm not as comfortable creating them as I am with other things. In this case, the background is blessedly simple and the green in it is easy to bring out in the characters to help harmonise the whole image.

## PRO SECRETS

### Working in low-res

I'm a big fan of texture in my tools when I sketch. For this reason, I tend to do my thumbnails and initial sketches in Photoshop zoomed in, to the point where the texture in my brushes really shows. It's only when I'm cleaning things up that I enlarge my sketches and work in higher resolution.

## PRO SECRETS

### Hunting down reference

Finding good reference can be hard, especially when I'm looking for something specific. Pinterest is usually my go-to resource for reference because it's comprised completely of sources people have gathered for specific reasons. Most of the time, I can find entire collections devoted to what I'm looking for.





## PRO SECRETS

### Incremental backups

Try saving incremental files and numbering them sequentially. I like to have old files I can go back to in case the file I'm working on becomes corrupt or I accidentally overwrite it (rare, but it can happen!) Or, if I want to go back to an earlier stage in the painting process and bring some non-merged elements back into my painting for editing, it's easily done.

PHOTOSHOP

# USE A CHARACTER TO TELL A STORY

**Kenneth Anderson** creates a fun, character-based illustration with an animation vibe and an emphasis on a clear narrative

**D**rawing characters is a passion of mine and I try to tell a story with them in every illustration I do. It can be subtle or forthright; as long as there's some narrative in there, the audience can relate and it brings an artwork to life. This is important in the world of animation – every character design I do for a client has to have a sense of story behind it.

When ImagineFX asked me to do the cover for an animation issue I knew I had to get an element of this storytelling in there. I threw a few ideas on the table, but this is the one that stuck. I'm glad too, because it has some subtlety – a story that relies on really looking at the piece. Why is this girl not scared of the thing casting that

ominous looming shadow over her? Her sketch reveals it's just a goofy, friendly monster.

My background in traditional animation definitely influences my illustration style. It's stylised and exaggerated, but I like to keep the colours and forms grounded in reality. I knew painting this would be tricky with the grassy background and heavy use of green – I find colour a challenge every time I paint. So I took it one step at a time, getting the elements I knew I could handle out of the way and figuring out the difficult bits as I went. My workflow is simple but not completely linear, so this workshop is a rough guide to how I work.

With all that said, let's get started!

**Artist PROFILE**  
**Kenneth Anderson**  
 LOCATION: Scotland

Since 2005, Kenneth has worked in games, 2D animation and illustration. He now freelances for a variety of clients as a character designer and illustrator.  
[www.charactercube.com](http://www.charactercube.com)

**GET YOUR RESOURCES**  
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## 1 Thinking, research and sketching

At the start of any new illustration, I mull over the brief and consider how I'm going to approach the work. I research anything I'm unfamiliar with and have a look at other artwork for inspiration. With the notes from the ImagineFX team in mind, I rough out some simple sketches, trying to find a distinctive idea and character in each one.

## 2 Refine the idea

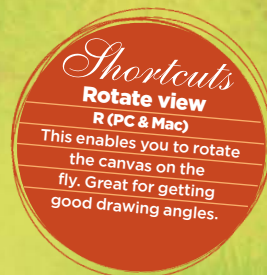
There's a bit of back and forth between myself and the team while we decide on a direction and lock down the image. It's important to get the characters and composition right at the earliest stages. If the character doesn't feel alive in a rough sketch, then no amount of painting will fix that!





## 3 Colour and value rough

Once the team is happy with the sketch I do a rough colour pass on a Multiply layer, switching to greyscale to check my values. I know the most prominent colour is going to be the green of the grass, so I base my colours around this. Red hair and dark clothes should make our character stand out.



## PRO SECRETS

### Tablet input settings

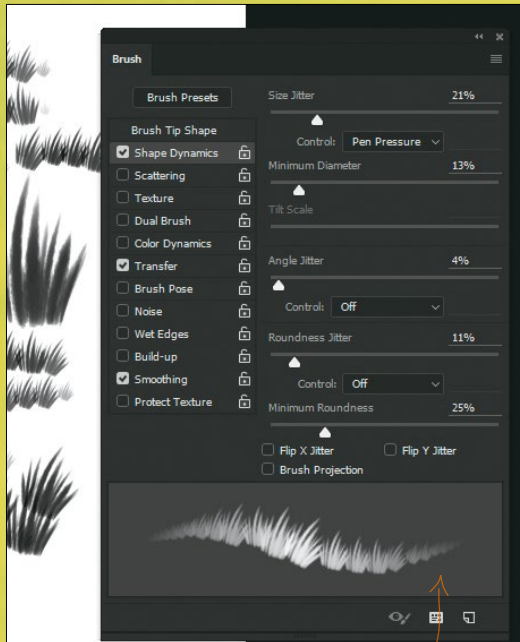
Photoshop offers a lot of control over how your tablet pen interacts with the software. However, I find the tablet device settings really useful and they complement the controls in Photoshop nicely. Try lowering the sensitivity input of your stylus for line art and sketching. Increase the sensitivity slightly and you have more responsive strokes – perfect for painting!



## 4 Prepare the canvas

After some tweaks to the composition the colour rough is approved. I like to paint at a higher resolution than needed so I double the required image size. I create reference layers with the bleed areas and the logo indicated, so I can switch them on and off to get a feel of how everything is working in context.





## 5 Create grass brushes

Before painting, I create some quick grass brushes. I want to use my own so they're consistent with the overall style of my artwork and have a more hand-drawn effect. They don't need to be perfect – just good enough so I can quickly lay down some texture and then paint over the top. I have supplied these brushes with your resources – see page 144 for how to download them.



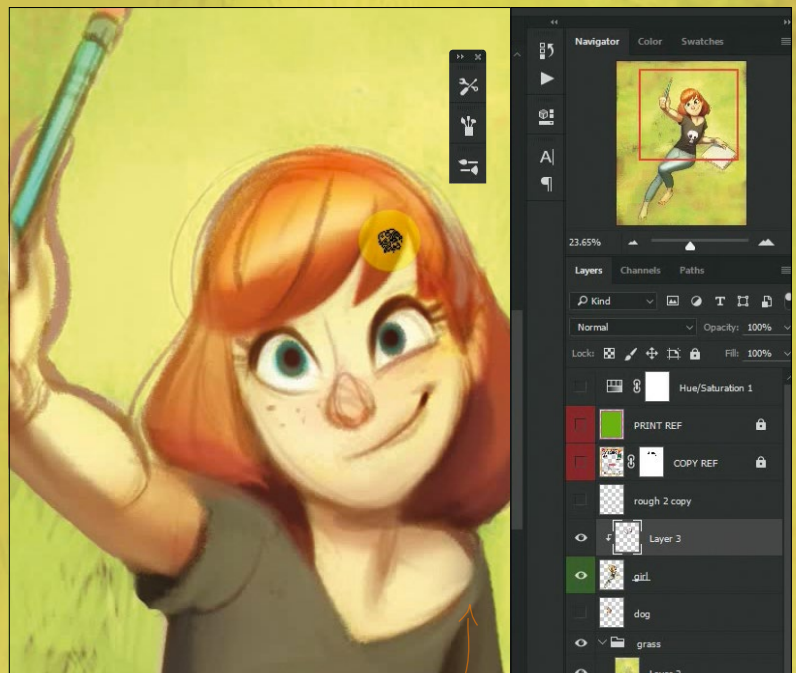
## 6 Red underpainting

I start painting from scratch with a default Pastel medium tip brush and using my colour rough as a guide. Because green will be a large percentage of the image, I plan to paint on top of a reddish underpainting. I want the red to shine through so the green is less harsh – a tip I learnt from James Gurney's book, *Color and Light*.



## 7 Background block in

Using my custom brushes and a default Pencil brush I layer in the grass. I'm careful about where the grass is in relation to the magazine cover text and where it leads the eye: I want the viewer's attention to be on the characters and not on the blades of grass, after all! I use Hue Jitter (in the Color Dynamics section of the Brush dialog) so that the colours vary. I'm keen for some yellows and blue-greens to be in there.



## 8 Bring in the characters

I copy the characters from my colour sketch and put them on separate layers. I have to be careful I don't lose their energy as I paint them up. Using the rough characters as underpaintings, I start to block in their forms on a clipping mask. This enables me to paint without destroying the original layer information. When I'm happy with my work I merge the layers.





## 9 Continue the block-in

I do a rough pass of everything, focusing on good values and getting colours that work together while avoiding too much detail. I throw stuff out there and see what works, painting until things start to feel right. I separate elements onto different layers: the flowers, shoes and jacket have their own layers. It makes it easy to move elements.



*Shortcuts*  
Create/release  
clipping mask  
Cmd+Option+G (Mac)  
Ctrl+Alt+G (PC)  
Quickly mask the chosen  
layer with the one  
that's below it.

## 10 Treating the shadows differently

I keep the main character and monster shadows on separate layers and start painting in cool hues to suggest the reflected "off screen" blue sky. I minimise details in the shadows and ensure that they're strong enough to suggest a sunny day. I set the main monster shadow layer to Multiply, but the girl's shadow is painted on a Normal layer because it doesn't need to interact with a complex background.



## PRO SECRETS

### Use greyscale to check value

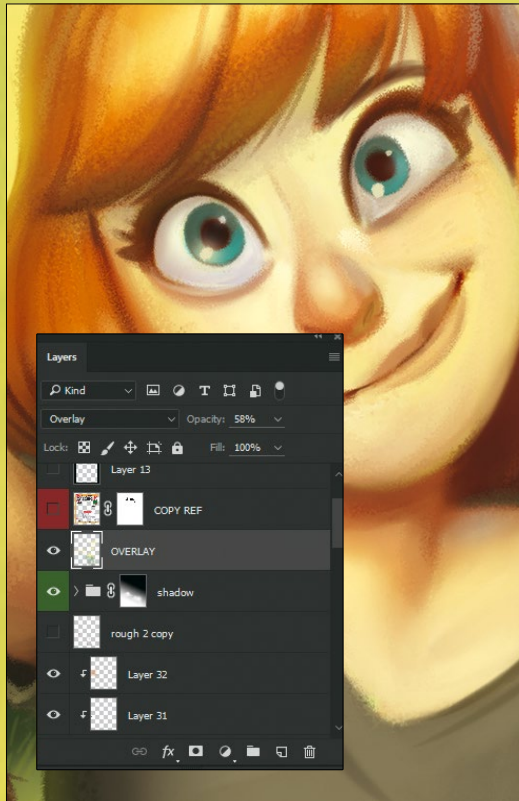
With a Hue/Saturation layer set to zero saturation at the top of your Layers panel you can quickly turn your image greyscale. I use this all the time to check that my values are working without the colour information distracting me. Try painting while switching this layer on and off - it really helps me focus on retaining good value structures and forms while I colour.



## 11 Rendering details and colours

With everything roughed out I start to render the forms, using the Color Picker tool to choose colours from the canvas. I try to bring the colours to life by adding subtle reds into the face and hands, reflected light from the grass and more cool sky reflections in the shadows. This is an ongoing process throughout the rest of the painting process.





## 12 Overlay some yellow-greens

Once I have most of the elements in place, I add an Overlay layer on top of all the layers and paint in some yellow-greens. I find this helps to bring to life the glows and transitions between shade and light. I switch this layer on and off while painting, so it doesn't interfere when painting on other layers.



## 13 More rendering and tweaks

By this point the major elements of the scene are mostly complete. I just need to tighten up forms and details and change any bits that I'm not happy with. I introduce more grass details, work into the flowers and adjust some colours in the faces of the girl and her dog before sending it to the ImagineFX team for final feedback.



## 14 Final polish

I get stuck into tightening up the details and making the changes requested by ImagineFX. I'm careful not to get too carried away with details because I want the image to maintain a looseness. I refine my Overlay layer and create a colour correction layer: my image is very green and I want to balance things out with some subtle reds. I also adjust the sight line of the girl's eyes so that it's clear she's looking at the tip of her pencil to help her complete the sketch of the friendly monster.



**RESOURCES**

**WORKSHOP BRUSHES**

**PHOTOSHOP**

**CUSTOM BRUSHES:**  
**GRASS A**

A simple brush I created and used to quickly suggest grass while maintaining my usual drawing style.

**CHUNKY CHARCOAL**

My go-to brush for sketching and laying in forms and colours. It's not included with this issue's resources, but is readily available from [www.kylebrush.com](http://www.kylebrush.com).



PHOTOSHOP

# SHARPEN YOUR ViS DEV SKiLLS

Dive deep into **Craig Elliott's** creative process from sketch and colour comp to the details of painting a flooded forest

## Artist PROFILE

**Craig Elliott**  
LOCATION: US

Craig Elliott is a film, TV and game production designer, art director and illustrator as well as a fine artist.  
<http://ifxm.ag/c-elliott>



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Here, I'll be showing the key points of my process in creating this environment piece. I'll also share some key philosophies about picture making. There are many

things to keep in mind when creating a painting that are more important than just techniques or tools. Habits you employ when painting are crucial to developing great work.

I'll begin with a sketch and colour comp, then move on to fleshing out the whole painting. My approach is to work up each part of the image using the same level of detail, as appropriate. So if one part of the painting is 25 per cent finished then I stop and bring everything else up to the same level of finish, before going back to working on that initial element. I'll keep moving on to different parts of the painting, bringing each element along in at least 25 per cent increments. Of course, not everything in the final composition will be rendered to the same level of finish, but that's usually the way in most of my paintings.

I find that it's also helpful to hold off from working on the main focal point for as long as possible. This enables me to keep a truer perspective on the secondary parts of the painting until I've finished the focal point.











## 1 Place key elements during the sketch stage

Producing a rough layout acts as a great guide when I'm doing the colour key. Having done so many detailed layouts in pencil doing my time at Disney, I've developed a bit of a shorthand process for this stage. I mostly want to place the important elements of the painting and leave details for later when I'm painting.



## 2 Tonal considerations

After my sketch I play with the tonal setup, mostly trying to take into account where my focal point will be and the necessities of realistic lighting, aerial perspective, and the shadow and light that play across the largest elements in the picture. For this stage I put the line layer on top of the tonal study.



### RESOURCES

#### WORKSHOP BRUSHES

##### PHOTOSHOP

##### CUSTOM BRUSHES: WATERCOLOR TRIANGLE

My main brush, and the one I turn Texture and Dual Brush on and off to achieve texture variety.

##### TEXT01

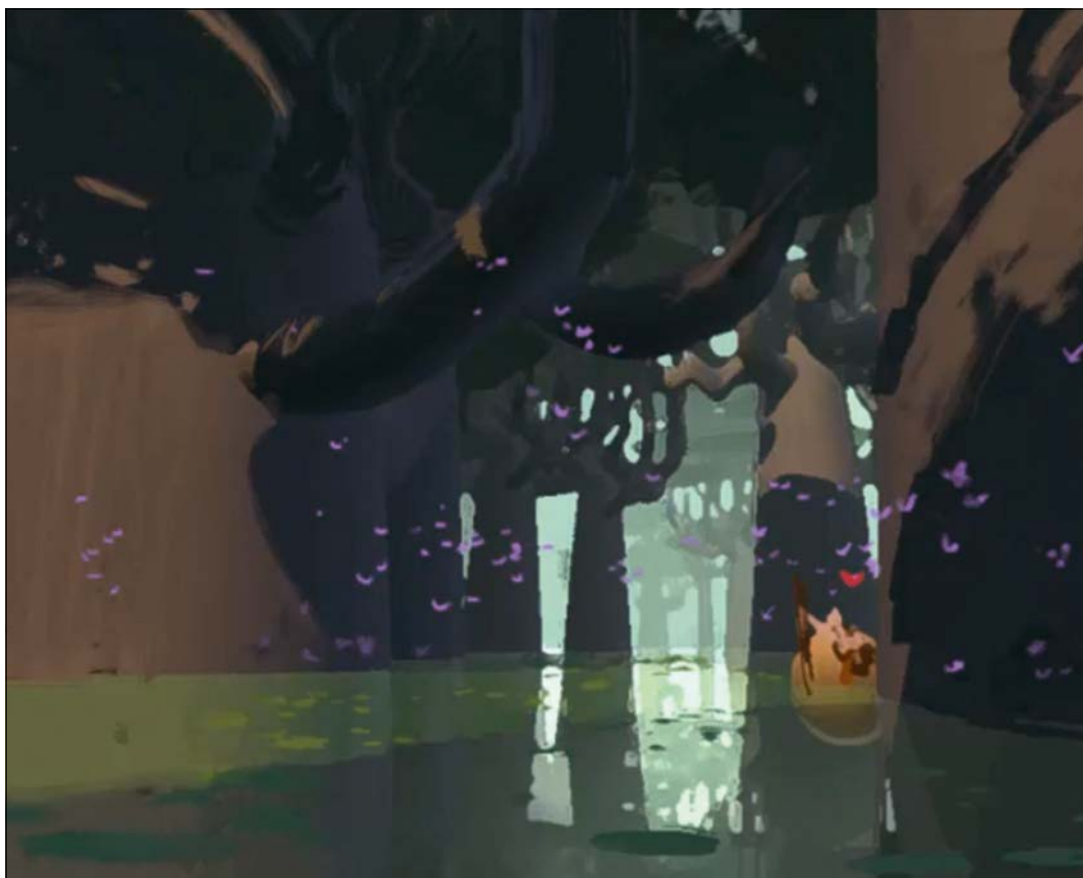
Great for wild painterly effects, streak effects for hair and blocking in. It responds to pressure and movement.

##### CHUNKY YEXTURE

Good for foliage, rough hair and especially tree bark. I built this one when working on *The Princess and the Frog*.

##### SAMPLED BRUSH 3 6

A special use brush. Used mostly for variety and randomness when something seems too painted or overworked.



## 3 Developing the colour key for the painting

In the colour key I basically paint the whole painting in miniature. I'll be making alterations here and there later on, but things don't change significantly from this stage. Then I increase the resolution of the painting to its final size. This introduces some jagged lines and pixellated edges, but that will all get cleaned up in the final painting.



## 4 Refining my colours

At this stage I adjust some of the colours that I laid down initially to ensure they're both working better and account for additional elements in the shot. I take into account factors such as the cool light from above and the strong light beam hitting the green murky water.



## 5 Beginning to render the large forms

I like to start my rendering with the biggest volumes in the painting. This may be a mountain or large buildings. Whatever fills the most volume in the shot, go for that first. Don't finish it of course, but make sure the shadows are correct, and introduce any rough form variations and secondary light sources you might require.



## 6 Cleaning up and adding texture

I take this opportunity to clean up any stray marks and begin to plan any necessary layer separations. I only intend to put the character who's over on the right-hand side and the lily pads on their own layers at this stage, so this is a relatively easy stage for this painting. I've already put the butterflies on their own layer.



## 7 Water cleanup

I clean all the water underneath the lily pads and removed all traces of the pads from this layer. Now I can paint the pads on a layer of their own that floats on top of the water. This is important because it enables me to paint clean, realistic water underneath the lily pads. ➔

## PRO SECRETS

### Versioning up

It's important to keep your file size small so Photoshop works as smoothly as possible. Large files can slow your computer down, making it hard to paint decent strokes. The solution is to flatten your layers and save a new version. You still can go back and work on those layers, but your current file size remains manageable.

## PRO SECRETS

### Be organised

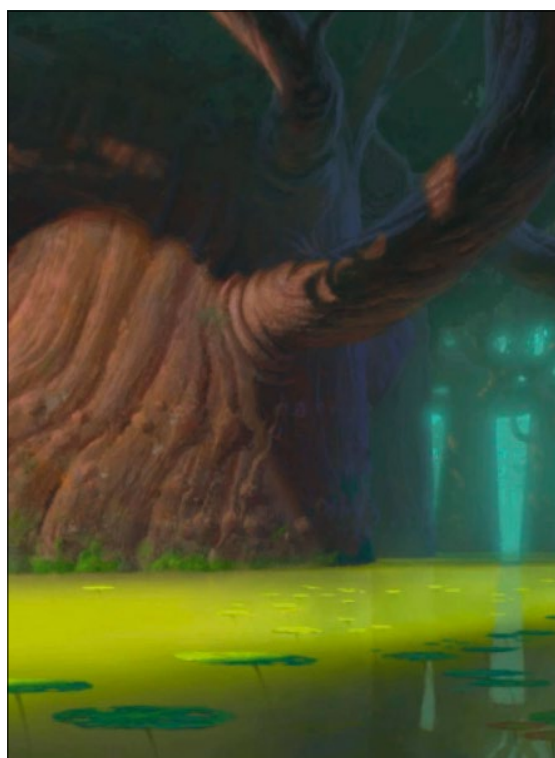
As a production designer and art director, I love organisation. Art created for animation morphs as the production goes on. Directors, executives and story fixers often require changes after a painting is completed. Grouping your layers, naming them and even colouring them are a huge help when making minor (or major) changes to your artwork. Your art director will appreciate it!





## 8 Finalising the colour of the water and lily pads

All the water is now cleaned up, and I've adjusted and cleaned up a new layer with all the lily pads on them. The pads still don't have their final detail, but their colour and placement is more or less final. There are still a few lily pad stems and such to do, but I need to move on and not complete this layer if I can avoid it.



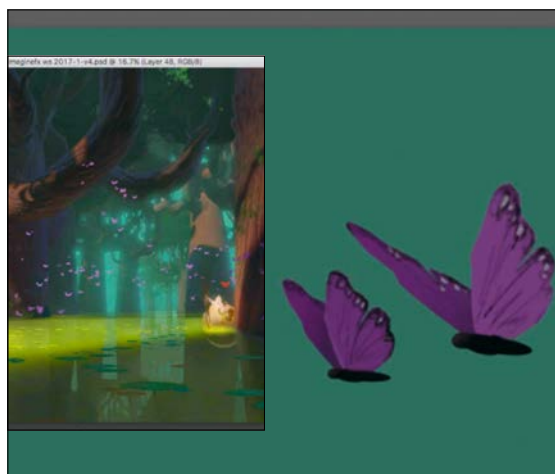
## 9 The effects of mist

Now I add a level of mist. I realise that the colour isn't quite right, but I can shift that later. I mostly want to achieve the right emotional feeling and be sure that I have a variety of shapes. Objects become more blue as they go further back, and drop in contrast.



## 10 Light rays and small insects

Adding light rays to the foreground left-hand tree helps to guide the eye towards my main subject, and link the atmospheric background areas to the foreground. In addition to the butterflies in pink, I want to add some tiny insects and dust that the light rays could pick up. So in this stage I add these elements and give them a hint of glow so they look like they're in a slightly misty space.



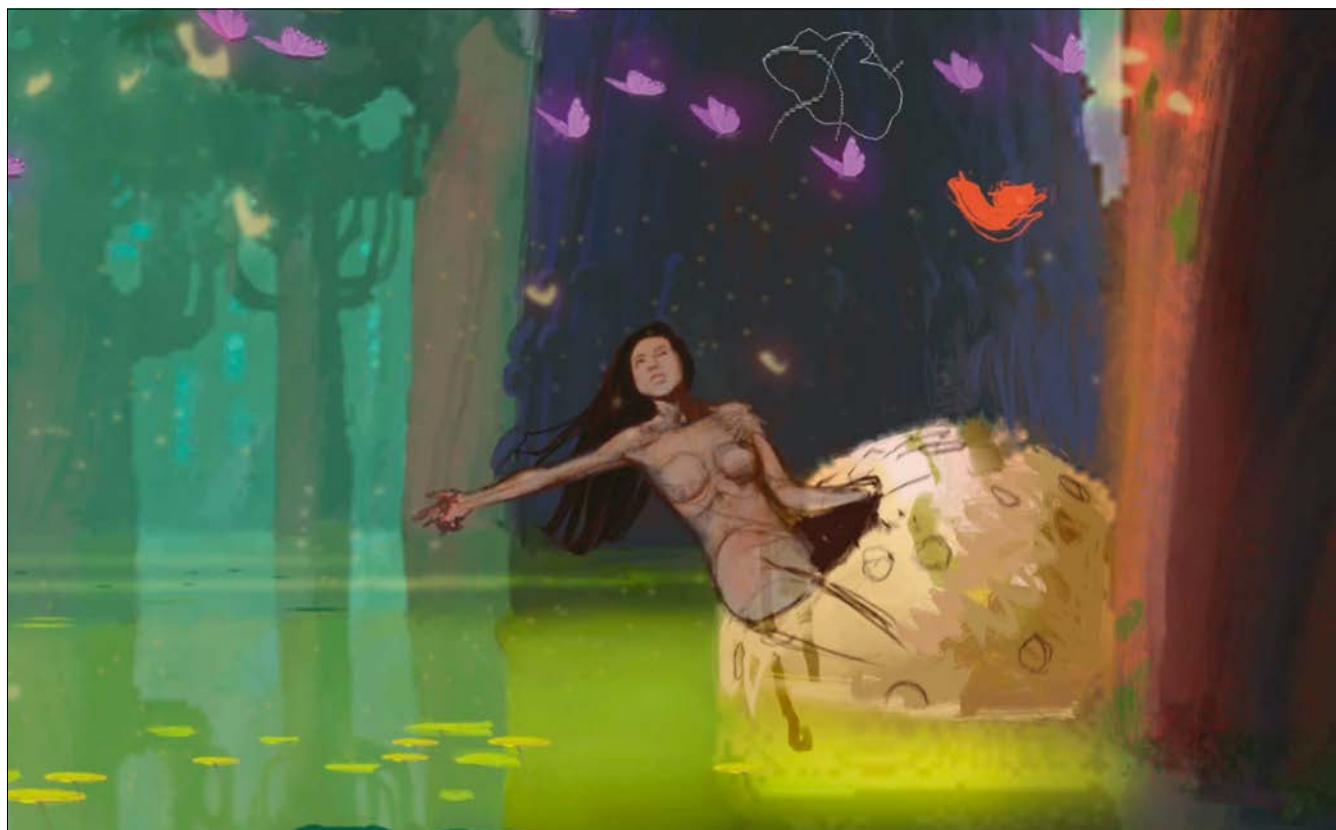
## 11 Adding some butterflies

I loosely paint four separate butterflies, making sure that they have a strong and recognisable shape. It's this shape, rather than any recognisable details, that will inform the viewer of what these airborne objects are. After I finish painting the first four butterflies, I copy and paste them into the actual painting, and vary their sizes and shapes. I only put them where I placed the markers earlier in my colour comp.

## PRO SECRETS

### Brush texture toggle controls

It's often useful to toggle the Dual Brush and/or Texture settings on a brush. When doing the initial rendering a rough brush is desirable to keep the rendering from becoming too tight. You can then turn off Texture to bring in the details just where you need them. This can be done all in one brush!



## 12 Time to bring in the lone figure

I've now painted everything to a decent level of detail and can't hold off painting the main subject any longer. First I draw the figure's outline and shadows in a reddish brown line, then fill in the shape and paint out the background. I focus on pose, gesture, attitude and emotion, without getting bogged down in rendering. Neither the character or the giant floating seed she's in are fully finished during this stage.



## 13 Cleaning up the character

This is the second stage of the figure painting, where I give the body form and colour variation. There's some outline cleanup here too, as I get the final shapes close to where I want them to be. The character in this painting is pretty small in proportion to the overall painting, so I won't add much more detail than this. I just need to add her bra and clean up the skirt a bit at this point.



## 14 Finishing touch-ups and added realism

My final refinements to this image include introducing a slight blurring of distant edges to account for the softening effect of the fog, and adding more true blues to the distant sky and tree areas. I need to shift the far colours away from green to make them more realistic. Objects become either more cobalt or warm blue as they go back into the scene, and the colours I had in place weren't working. ●



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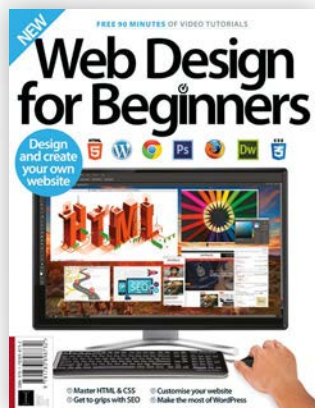
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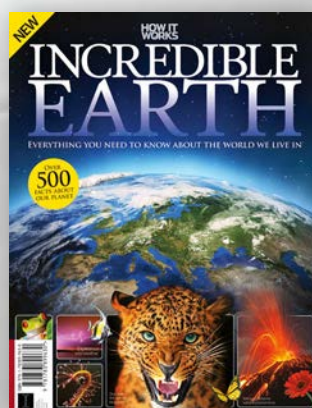
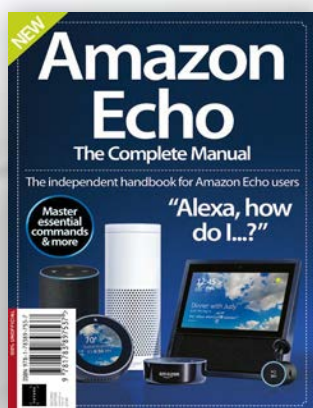
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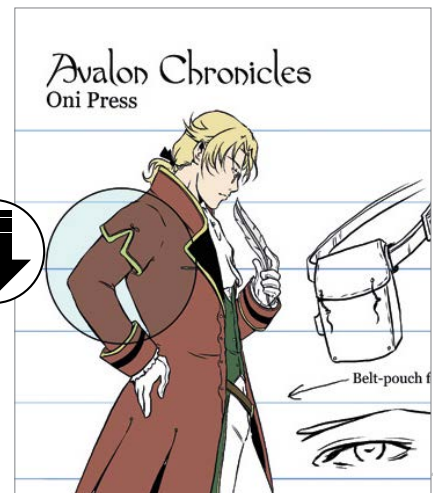
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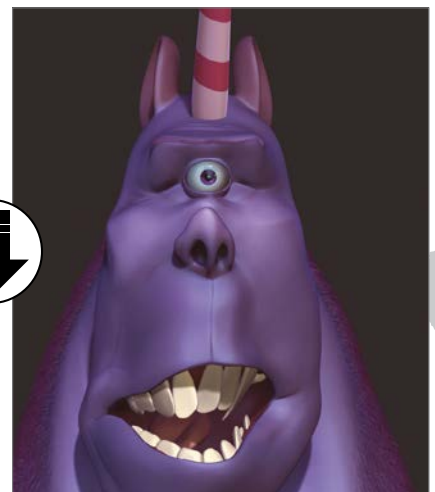
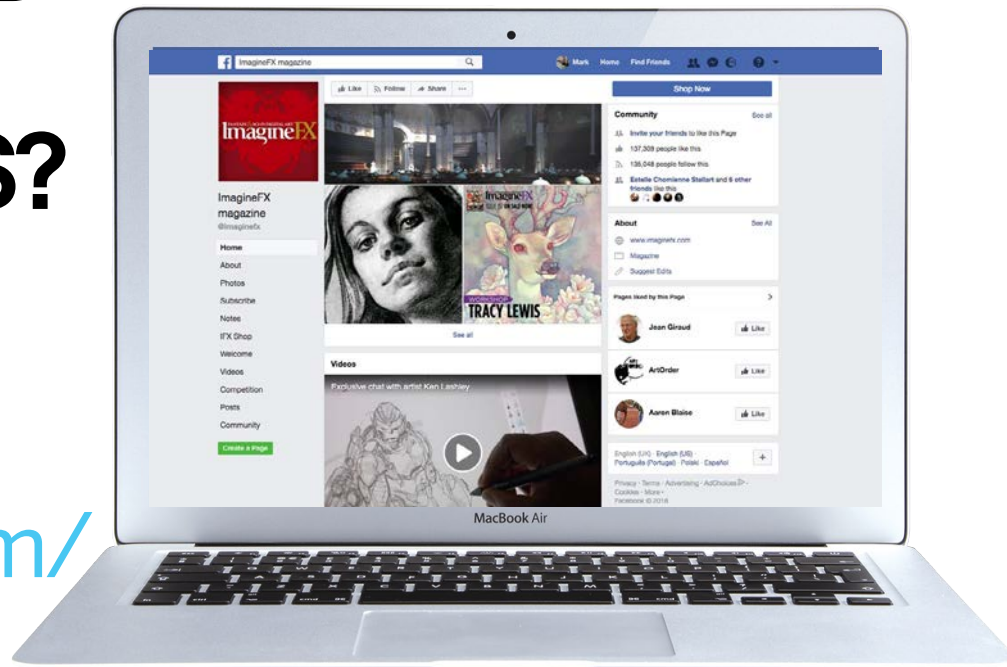
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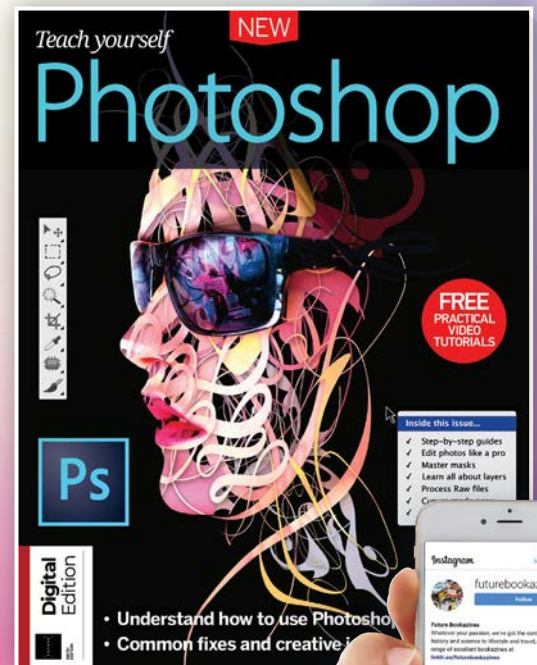






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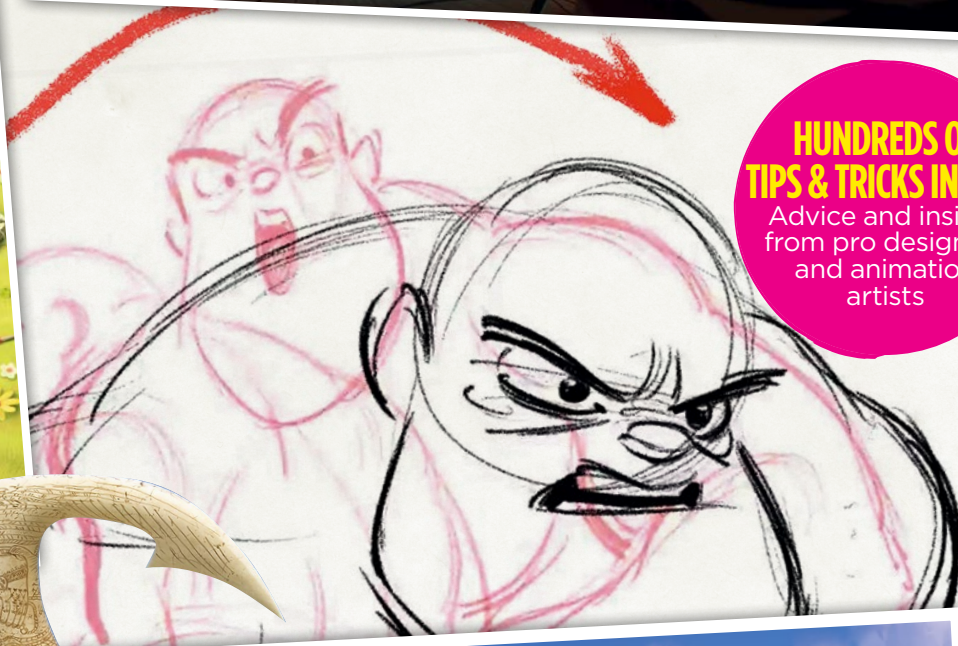
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