

A high-quality digital illustration of three pirates standing on the deck of a ship. The pirate on the left is a Black man with a brown headband, wearing a brown leather vest over a white shirt, holding a cutthroat. The pirate in the center is a white man in a white hooded tunic with a red sash, holding a cutthroat. The pirate on the right is a white man with a long black beard and a black pirate hat, holding a cutthroat. The background shows the ship's rigging and sails under a blue sky.

MOVING PIXELS

*** THE ART OF VIDEOGAME ANIMATION ***

As videogame animation ploughs towards the next generation of consoles, how have the industry and its processes changed?



While the software and raw mechanics of CG film animation and its videogame equivalent might be very similar, the challenges surrounding the latter are vastly different. Where film enables a director to point, shoot and enjoy an audience stuck with the camera perspective, videogames often don't have that luxury. Game animation needs to look right, move well and feel great from any angle. Plus, with the next-generation of consoles looking to enable even more visual fidelity, these challenges are only going to grow even tougher.

The biggest gaming projects are as complicated as big-budget movies, but require much broader skill sets. Just look at the latest blockbuster on PS3, *The Last of Us*; a multi-million-dollar, full-scale project that requires micro-level detail in its subtle animation blends, all the way up to full motion-capture performance work using real actors. It's an almighty undertaking that's by no means uncommon.

This is a multi-faceted world, too. There's obviously character animation, the bread-and-butter of any videogame movement, which is usually handled through motion capture and blending. Beyond that, though, there are countless incidental animations that many gamers would never even think of, from user interface animation to background movement. This is where a great animator really pays his or her dues.

3D Artist spoke with three animators in different sectors of the industry to see just how the often-misunderstood world of game animation is changing. We chatted to Georgia Arena, an animator at breakout British studio Mind Candy (www.mindcandy.com), the team behind the wildly popular global phenomenon that is *Moshi Monsters*, among others.

Next, we have Nicholas Rodgers from long-standing UK team Frontier Developments (www.frontier.co.uk). He has worked on projects ranging from kids' games to complex sci-fi worlds, his experience bridging the gap between small indie gaming and large-scale studio work.

Finally, Jonathan Cooper heads up all animation at one of the biggest studios in the world, Ubisoft Montreal (www.ubi.com/enca), responsible for *Assassin's Creed*, *Far Cry* and the forthcoming *Watch Dogs*, among countless others. His experience dealing with huge projects (upwards of 600 people on a team) and subsidiary studios gives a fascinating insight into the challenges a modern videogame animator faces when working on a blockbuster.

Moving pixels

* Interviewees *



Jonathan Cooper

Company
Ubisoft Montreal

Location Canada

Key projects
Assassin's Creed III,
Watch Dogs



Nicholas Rodgers

Company
Frontier

Location UK

Key projects
Kinectimals,
LostWinds



Giorgia Arena

Company
Mind Candy

Location UK

Key projects
Moshi Monsters

TOOLS OF THE TRADE

No matter what the scale of the project, everything has to start with raw data, software knowledge and technique. "Depending on what kind of animation they're working on, and sometimes based simply on their preference, our animators work in either MotionBuilder or 3ds Max's Biped animation system." Explains Jonathan Cooper, who oversees the work of many teams at Ubisoft Montreal. "In-game animation is done mostly in the latter, as we find it the quickest way to see results.

"More motion capture-reliant actions, such as a fight system, will briefly pass through MotionBuilder to set up the scene before being torn apart then rebuilt with an animator's eye in Biped," continues Cooper. "All cinematic cut-scenes are created in MotionBuilder for two reasons. First, the way the rendering engine works enables a much faster frame rate when working on scenes with multiple hi-res characters with many bones in them - something essential for quick iteration. Second, because the Story Mode editor enables us to quickly and

easily assemble then edit all the elements, such as cameras, characters and audio, that make up a cut-scene. Having all these elements at our disposal enables animators to have complete control over how the cinematic sequence is played in the engine. More iteration time enables even more polished results."

Giorgia Arena has a slightly different take on proceedings, given that she works on much smaller projects with a lighter bandwidth requirement. "As I'm working for mobile games, I don't use the latest technologies. At the moment I'm working with Maya, but I don't necessarily think it's the software that makes the difference."

But what about the mid-range projects? Nicholas Rodgers talks through his day-to-day workflow at Frontier. "Currently I'm using 3ds Max as my main 3D package. Other studios might use Maya or XSI, but whichever you choose that's where the bulk of the animation work gets done. Most customise 3ds Max with a whole bunch of in-house scripts for everything from storing and managing poses to updating rigs and batch-exporting the scenes. In addition to this, we have an in-house animation blend tree software to enable our animators to have greater control over the animation when it goes into the game. These tools let you lay all your animations out like a flow diagram and decide what animations should play when, how they blend from one to the other and even let you layer multiple animations over one another to add greater detail." However, like Arena, it's not all about the tech. "Tea is also an important tool that mustn't be overlooked," Rodgers adds.

These might be the tools of 2013, but even in the past ten years game animation has changed so much that it's almost unrecognisable, with new technology constantly shifting boundaries. 2D art was the norm in the 80s and 90s, but 3D animation became the dominant style in the late 90s. With the advent of polygon-driven gaming, so too came motion-capture, used at first in sports games but soon responsible for almost every type of human character animation in big-budget games, as Cooper explains. "The biggest change has been the widespread adoption of motion capture as not only a production-friendly method of generating movement systems, but also adding an extra level of consistency and believability to characters in sequences.

"Working with actors has always been one of the most fun and human-centric elements of my job," Cooper adds. "Even so, improving technology and the demands on the artistry of animators, so as to retain as much of the subtleties of their performance as possible, is a constant challenge."



The next generation is poised to present even more believability to gamers and more challenges to artists

CAPTURE THE MOMENT

This challenge that mocap presents is something Rodgers can relate to as well. "I've used a lot of mocap over the years and even worn the Lycra suit myself a few times! The way that you use motion capture in games can vary a great deal from project to project. When you're using mocap for cinematics you can pretty much capture the whole performance similar to how you would video it, but when you want to use it for creating in-game animations you need to consider how you'll have to author that footage to work in-game," he explains.

"For instance if you were capturing a whole bunch of different runs in various directions, in order for them to work in-game you'd have to make sure that they covered the same amount of distance in every run, started on the same foot, took the same amount of footsteps and that all the start and end poses match the poses they were coming in and out of. Sometimes the style of the game you're animating for requires you to push the motion way past what the actor originally performed. In that instance you would use the mocap as a base to hand-key much stronger poses and timings in over the top. You'll see this a lot in fighting games, where the original capture might feel too soft when in-game."

"I've wholeheartedly adopted motion-capture since my initial explorations with it almost a decade ago and have used it in a

major way in every project since then," adds Cooper. "However, my real focus is in how good the characters look and feel. I will use whatever method best gets me there. I was initially a bit mocap crazy – requesting that the animators stay as true as possible to the original mocap look and feel with all the imperfections it brings – but over the years have realised that it's our job as animators to add to everything we see. Exaggerating and enhancing everything, from timing and posing to facial details, ensures that the characters players see on-screen are larger than life – real life simply isn't real enough!"

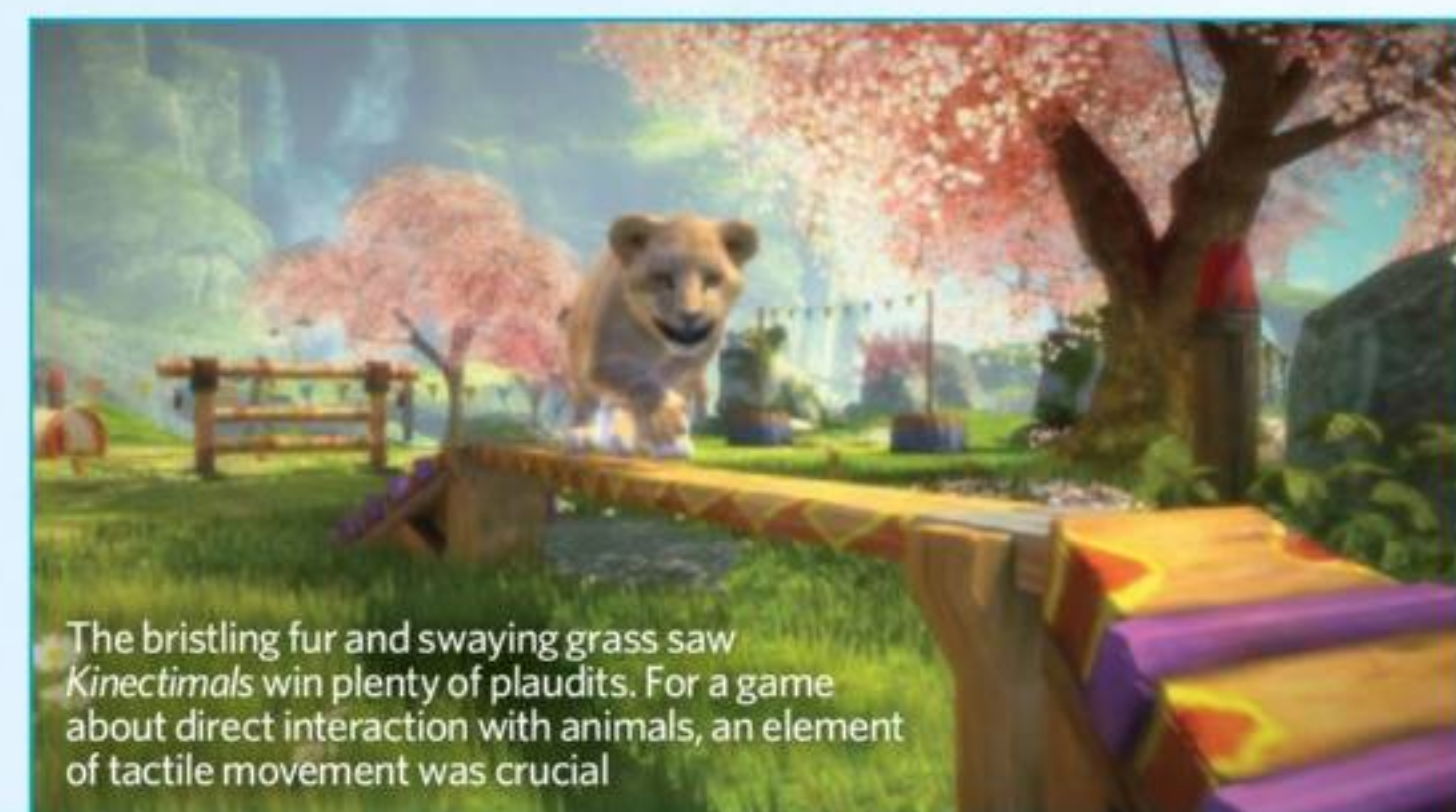
So is realism the ultimate goal for animators as technology and techniques improve? "I don't think it's about realism, but about being believable," explains Arena. "You can animate a monster with eight limbs playing a piano and still make it believable. I don't think the future is concerned with realism," Rodgers agrees: "I'd like to see all the advances in animation technology help us to achieve much more organic-feeling, unrealistic animation in games. If you try to make everything look like a film, something's always going to look a bit odd. However, if you tried to achieve a squashy, stretchy, snappy style, like in the Pixar films, you could play up to the nuances of videogames but maintain a consistently unique and interesting style."



If you've got children of a certain age then you've likely heard of Moshi Monsters. The characters' animation is simple but loveable, and is key to their popularity

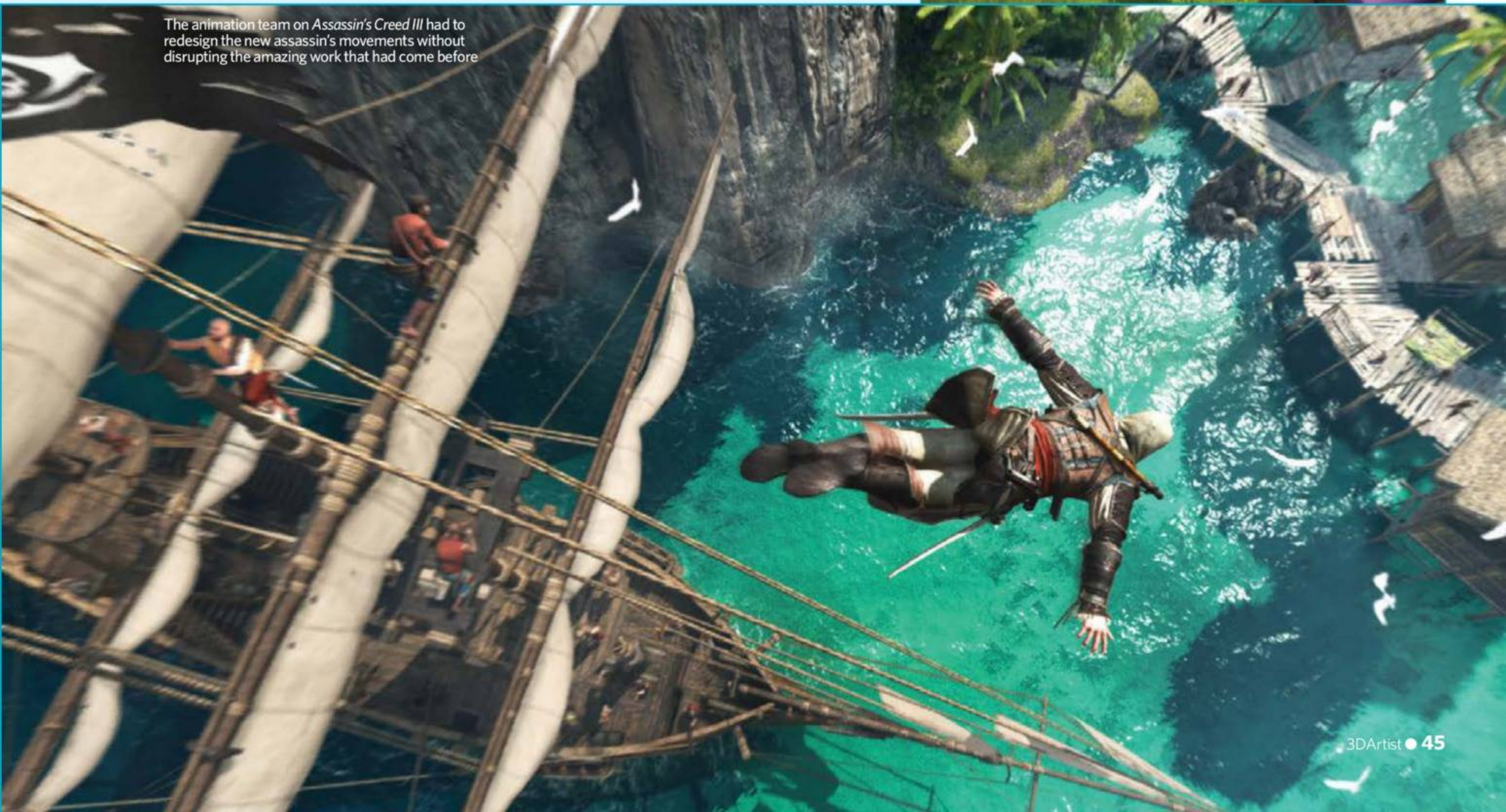
“I’ve used a lot of mocap over the years and even worn the Lycra suit myself a few times!”

Nicholas Rodgers, lead animator, Frontier Developments



The bristling fur and swaying grass saw Kinectimals win plenty of plaudits. For a game about direct interaction with animals, an element of tactile movement was crucial

The animation team on Assassin's Creed III had to redesign the new assassin's movements without disrupting the amazing work that had come before



Moving pixels

CHALLENGE IN MOTION

"What we're striving for, in my opinion, is believability," Cooper adds. "One avenue to achieve this is realism. However, as suggested this comes with its own problems in terms of making certain issues we currently accept with videogame animation more noticeable, such as unnatural weight-shifts and changes in momentum to name but a few.

"A better and more general approach is to break down as many of the disconnects players have between what they want to do and the actions of their on-screen persona. Reaction times are key, but usually come at the expense of fluidity. We have ways of tackling this now, involving a greater reliance on physical simulations and better integration of motion – both of which still heavily rely on the skills of an animator.

"In terms of pure believability in cinematic cut-scenes related to acting and facial performance, I still believe our biggest challenge is not in terms of technology, but in terms of storytelling and drama. However, we're very much learning how to best deliver this in an interactive medium. Sometimes it feels that every new game is breaking new ground in that area, so it's a very exciting time for animators to be in this industry," Cooper explains.

It's always interesting to hear about any professional's biggest career challenges, but when it's an animator, sometimes the toughest jobs are the ones you wouldn't notice – movements so subtle that you would need an animator's eye to even realise how much of a challenge they must have been. Cooper explains: "By far, the biggest challenge was creating Connor Kenway, the protagonist in *Assassin's Creed III*. The initial mandate when starting out was to completely revitalise the movement of the assassin, which already had a high standard set in the previous games.

"Additionally, because the assassin was already an established character that players know and love, we had the extra challenge of changing everything, but at the same time keeping consistency. As such, we looked for chances to bring new style to the combat, navigation and assassinations, while still retaining the trademark weight and fluidity that the series is known for.

"However, I didn't simply want to replace animations and end up with the same game. We reworked many of the systems underneath and added new physics technology to not only increase the visual fidelity, but also make Connor feel better under the player's control. We ended up improving every system in the game and added many more to provide players with one of the most rounded and capable characters of any action-adventure game."

For Rodgers, Shadow, the dog in *Dead to Rights: Retribution*, proved a challenge. "He was this huge, wolf-like monster of a dog that had to be able to grab enemies and throw them around all over the place, so there was a lot of weight transferal to consider when animating him. It wasn't the sort of animation you could film yourself acting out," he explains.



Ubisoft Montreal's next major release is *Watch Dogs*, which has been credited for its realistic animation



A horse is already a challenge, but one that can be controlled by the player even more so

* Crowning achievement *

"I'd say the thing I'm still most proud of to this day is the *Mass Effect* conversation system," Cooper tells us, referring to his time working with EA. "We had the challenge of delivering over 80,000 potential lines of dialogue (the equivalent of four novels or 15 movie screenplays' worth) in an interactive manner while also raising the visual fidelity of facial acting, at the time, in videogames. While the sequenced gestures and systemic facial performances may look a little robotic now, what we created stood the test of time for the two following games in the trilogy and I believe ushered in a new standard in interactive narrative delivered in a cinematic manner, with many players becoming increasingly attached to their own personal Commander Shepard as their choices unfold as a unique story. This, in my opinion, is the ultimate goal of videogame animators – to create memorable characters that deliver personal stories for players as we better realise the true potential of our uniquely interactive medium."



The facial animation in 2007's *Mass Effect* was incredibly impressive for RPGs at the time



“It feels that every new game is breaking new ground in storytelling, so it’s a very exciting time for animators to be in this industry”

Jonathan Cooper, animation director, Ubisoft Montreal

“Your demo reel is the primary way to land a job. It’s the standard by which you’re measured”

Jonathan Cooper, animation director,
Ubisoft Montreal



PRACTISE ALWAYS MAKES PERFECT

With game development becoming an increasingly lucrative and sought-after career, there are fewer opportunities to break into the industry. There is hope though, but it’s going to take work, as Arena tells us. “Watch everything. Watch movies, watch TV shows, watch cartoons, watch people in real life. The software is not so important, in my opinion, it’s all about observing and practising.”

“There are a lot more online references and blogs than when I was studying,” adds Cooper. “I’d suggest the best way to start is to compare where the bar is set by other students around the world, not just in your classroom. Additionally, starting your own blog is a great way to interact with other animators around the world, not to mention being a great avenue to showcase your work. Ultimately, your demo reel is the primary way to land a job in the industry, as it’s the standard by which you’re measured and the only real way for a prospective employer to see your talent before they work with you.”

“As for the quality of your reel, that will be up to your own talents and hard work, but I can certainly suggest the contents. The game animation demo reel should consist primarily of game-like sequences and cycles, ideally moving through an environment or in combat with another character. Acting sequences are now standard and a great way to show your

understanding of performance and character, as well as breaking up your reel in an entertaining manner.”

What if you’re truly starting from scratch, though? Gone are the days of the flipbook and pen – in order to get a head-start in this industry, you’ll need to focus your attention on practical and pragmatic measures, as well as get as much time on actual animation rigs as possible.

“I’d recommend that anyone thinking of getting into animation professionally should start by studying the fundamentals of animation first and going from there,” Rodgers explains. “Spend a lot of time doing basic exercises, such as animating bouncing balls of different weights and consistencies, then build up to a full character rig. All those lessons you learn at the start will be the foundation of all the character animation you do for the rest of your career.”

“There are some great free rigs available on the internet, so if you’re planning on specialising in animation I’d recommend downloading one of these and start putting together some showreel pieces,” Rodgers continues. “Ensure your work demonstrates a strong understanding of weight, posing, timing, that you know how to act, as well as how to make a character seem alive with its own internal thought processes.”

Rodgers concludes with some words of wisdom: “Your reel is the single most important thing in any application, so only show your very best work. You’re only as good as the worst animation on your reel!”

* Background artist *

We all know that character movement is the bread and butter of an animator’s job, but there’s a huge amount of background and set-piece animations that would rarely get a mention in a traditional game review.

So, what has Rodgers worked on that a layman would never notice? “All sorts of things that you’d probably never thought an animator would have done!” he says. “I’ve had to animate bridges falling apart, stage lights moving around, flags flapping in the wind... all kinds of little details that go into the environment. It sounds like dull work, but secretly one of my favourite jobs is filling an environment with tons of little animations that just bring the level to life. Having an animator’s touch on something as simple as a door opening and closing can really help add a bit of character to an otherwise ordinary action.”



The eye’s drawn to the main character in any game, but it’s the background movement that helps bring the whole scene to life