



**THE
CORE
SKILLS
OF**

VFX

**STUDENT
PRIMER**

**25 GEMS OF VFX ADVICE
FROM THE INDUSTRY ITSELF**



WELCOME TO THE CORE SKILLS OF VFX STUDENT PRIMER **25 GEMS OF VFX ADVICE** **FROM THE INDUSTRY ITSELF**

What's the Primer for?

In our conversations with the brightest and best of the VFX industry, we found whatever aspect of VFX skills were being discussed, a series of common core skills and attitudes that every new entrant should be armed with always popped up. So we gathered these together into this *VFX Core Skills Student Primer*.

Our VFX industry advisors wanted to give you the best head start to get into the VFX industry.

You can see the Primer as a companion to your studies, whatever they might be. Our advisors wanted this to be a helpful dose of reality, but also to inspire and encourage you.

It doesn't pull any punches; but if you supply the hard work and ambition, you'll find the Primer amazingly helpful.

This document isn't a training course or a software manual; it's more important than that. It's a guide to the aptitudes and behaviours that you can adopt to succeed in the world of VFX. The Primer is something you may want to check in with every so often to see how you're measuring up.

Whilst there's an abundance of information available nowadays about visual effects, from online video clips to websites and books, our advisors told us there's precious little that helps prepare learners for a career in the industry, or gives an insight into how you might be able to fit into the culture of professional VFX.

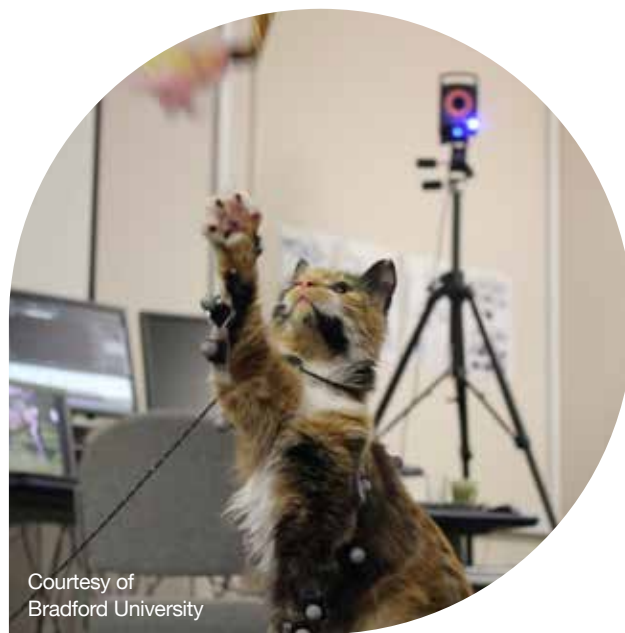
At first the Primer might seem daunting – 25 gems of advice from top experts – but these aren't a series of demands or prescriptions, they are helpful tips to the work culture of VFX from people who remember how hard it was to get guidance when they started. Internalise, live and breathe these guides to ensure a rewarding career in VFX. Taking the time to read this will repay you many times over in the years ahead.

For this current issue we've added something new: quotes from top industry professionals, which reinforce the 25 gems. This is not an academic document, it's a means by which one of the most exciting creative industries in the UK can speak to you directly. We hope you're up to becoming the next generation of pioneers in this industry.

Start your journey into the world of VFX with this Primer. Our industry advisors wish you good luck!

Saint John Walker
Editor, the Core Skills of VFX Student Primer

INTRODUCTION TO THE CORE SKILLS OF VFX STUDENT PRIMER



Courtesy of
Bradford University

25 gems of VFX advice from the industry itself

If you are just starting to learn about VFX then this Primer is a good place to start. It represents the voices of over 100 visual effects experts who have successfully risen through the ranks from college or university themselves and who want to pass on their experience and advice to the next generation who are studying now.

The aim of this guide is to list the core skills and behaviours that are universally useful across all VFX

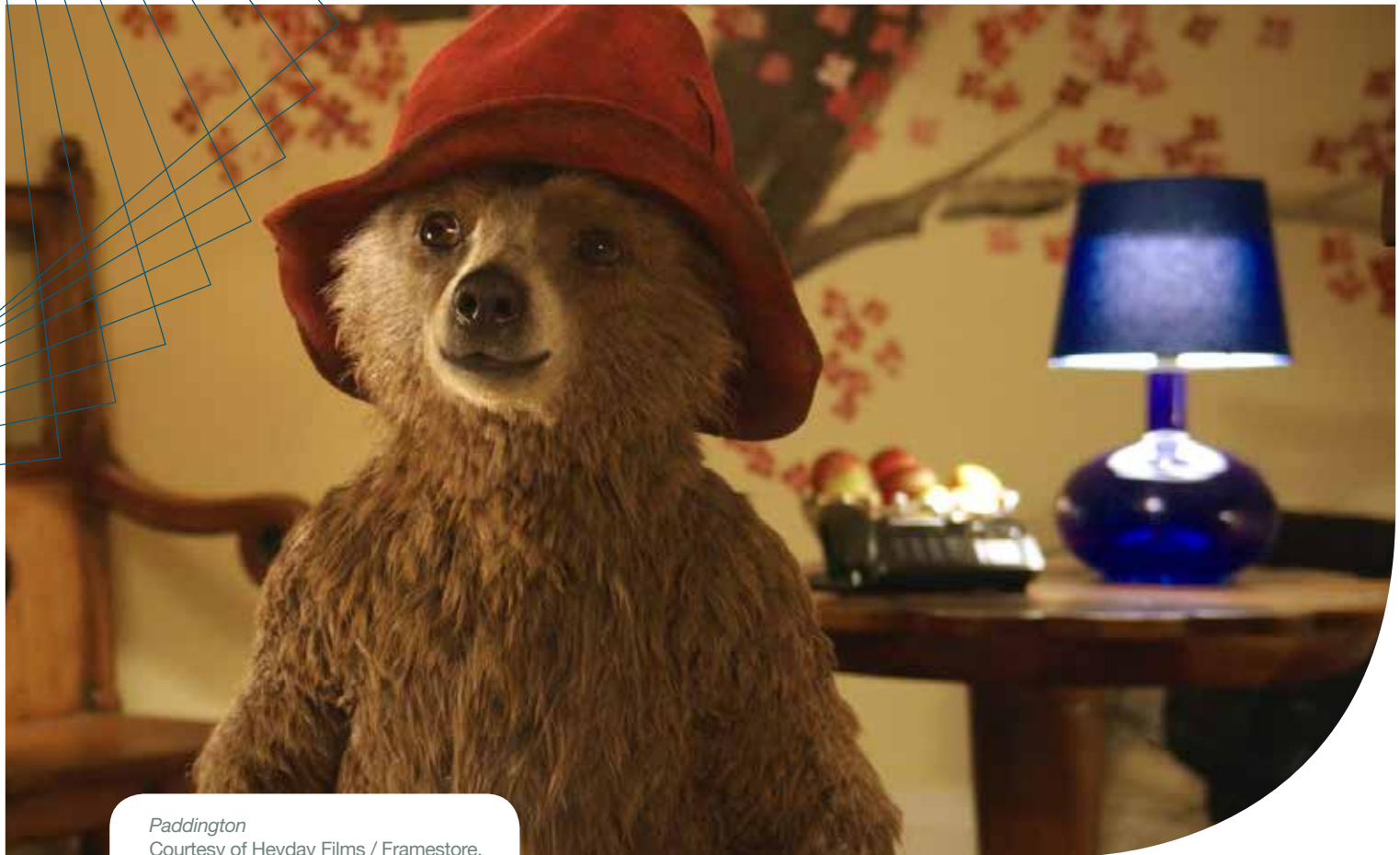
departments, companies and specialisms. It also hopes to dispel some of the common myths (it's not all about technology) and to give you advice on how to improve.

These 25 gems or points represent golden advice and guidance to carry with you and consult regularly as you travel along your path of study.

Let's go!

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Paddington
Courtesy of Heyday Films / Framestore.

1.

WHERE DO YOU FIT INTO THE VFX SPECTRUM: SPECIALIST OR GENERALIST?

There's no one single type of person who makes it in VFX. People get there from a multitude of pathways, a multitude of studies; maths and physics graduates can help create new realistic simulations and design software and technical solutions, whilst arts graduates can bring the creative skills to fool the eye and make the pulse race quicker with startling new images.

Whether you have strengths in the arts or sciences or whether you're a mix of the two, it's good to start thinking about what role you'd really be interested in doing. For a start, are you a specialist who likes to work on perfecting one thing brilliantly for long periods

of time, or more of a talented generalist, spanning across a range of tasks? Both these types of person will find careers in VFX.

Generally the bigger the company (and you have done your research, right?) the more specialist the job roles are. Smaller VFX houses or commercial departments tend to require generalists – people who can model, animate and light and can cover a range of functions to get the work done. Specialists, on the other hand, can get a kick out of seeing their contribution to massive team efforts, like feature film VFX. This isn't a cut and dried distinction of course, but it's a good idea

to think carefully about where your strengths lie along this spectrum as you learn and progress, because that'll give you a strong steer about which kinds of company you may want to eventually work for.

“Generalist or specialist can often come down to how an individual company works. However, knowing the whole VFX picture will help you understand the overall process and work more effectively with other departments.”

Matt Leonard, Lead Lighting Instructor, MPC

To find out where you fit in, try out different roles and specialisms across VFX whilst at college – have a go at areas outside your comfort zone, too. If you're an artist, try Python; if you're a computer science kind of person, try digital sculpting in ZBrush. Find out what you are good at, what your strengths are and where they fit on the VFX spectrum.

Some students instinctively shy away from specialism, believing they need to dazzle prospective employers with the widest array of skills, thinking this gives them a greater chance of being employed somewhere, anywhere. This is a form of faking it and you'll be rumbled. Be true to yourself and you'll find your niche.

“A generalist will thrive in small companies or departments working in short form work where there are little jobs with quick turnarounds. Specialists can fit into larger teams where the pipeline becomes more complex. Generalists who can handle most skills are invaluable, but make sure if you label yourself a generalist you really can handle what you claim to extremely well!”

Phil Dobree, Creative Director, Jellyfish Pictures

Also some students mistakenly think generalist implies some kind of second-class role. Not at all – if your work's good, companies will bite your hand off. Don't be afraid to proudly label yourself as generalist to let everyone know.

Another way to think about this spectrum of talent is from the recruiter's point of view. The easier you can make it for the employer to know which particular area you're good at, whereabouts you are on the spectrum, the better the chance you have of being hired into the right role in the right company. Employers like rough diamonds that have a little bit of shape already.

“The best team is made up of a mix of generalists and specialists so you can all work together to get the highest quality results with the best possible workflows. There is always another or different way to solve a problem in VFX and the more approaches you are aware of, the more informed and impressive the final output will be.”

Ceylan Shevket, Global Head of Tech Animation, MPC Film

So, try the breadth of experience, but also taste the depth of specialism and then assess whether you're more of a generalist or specialist. That way it'll be easier to find the most rewarding work for you.



Paddington
Courtesy of Heyday Films / Framestore.

2.

PATIENCE, YOUNG SKYWALKER...

It's great to be ambitious but this stuff takes ages to learn and refining a shot and paying attention to detail often needs to take a large proportion of your total time – but it's worth it.

“We see a lot of reels where graduates have tried to do too much. Sometimes it can take just one or two really polished and professional looking pieces to get you the job – we don't need an entire short film!”

Amy Smith, Head of Recruitment, Framestore

Don't rush. Try to master the basic techniques before embarking on that dystopian sci-fi film you always wanted to make. A showreel with a few detailed quality shots will get you work. Take your time – recruiters really notice where shots are refined and meticulous and they'll notice if your roto is a couple of pixels out or your key edges are artificially blurred. Take time to get it looking right.



Courtesy of MPC

If you're learning VFX at college or university, don't rush ahead. There's a reason why your course has been designed the way it has. Serve your time getting things right before rushing into what you consider the more exciting chance to make your own magnum opus. Displaying strong narrative filmmaking and cinematography skills is great, but if your work lacks the bedrock of decent modelling, animation, texturing, lighting or compositing skills it means you end up pleasing no one.

“Quality over quantity. Start with simple concepts and execute them beautifully and brilliantly with attention to detail rooted in reality.”

Andrew Schlüssel, Global Head of Training and Development, MPC

“I made a total mess of my showreel. I tried to do it all – playing around with techniques, really far-out concepts, prioritised narrative over technique. These days a reel like that would struggle to get you an interview. Fortunately back then it was a less crowded field – but I still had to work my way up and didn't get an artist job straight away.”

Gavin Graham, Head of 3D, Double Negative

3.

VFX IS A TEAM SPORT

To try out different specialisms, teamwork is the way to go. To be able to show evidence that you are a team player who has tried different roles is a powerful statement at any job interview. Chances are you'll have a better visual product for employers to view. However, a word of warning – be aware you'll need to explain clearly your contribution. It's quite possible the recruiter has seen other members of the same team, so will be keen to get a good idea of who did what – so no exaggerations please!

“Learn how to build ‘human readable’, truly collaborative VFX set-ups that allow for sharing, art direction and quicker revision. This needs to be a habit formed at the start of any journey in learning VFX.”

Ian Murphy, Training Lead, MPC

VFX is often created by a large team of individuals. A team-player attitude will win you friends very quickly. As a member of the team, you need to do enough to any creative asset to ensure it is passed on to the next person to a standard that enables them to contribute efficiently and creatively too. Depending on the size of the facility, there may be a dozen or more people working on a single shot and each one of them will bring something of their own creativity to it. Get to know the rest of the people you're working with and understand what they do and how you fit in to the bigger picture. Discuss the work with them, particularly with the people you're handing over to. What could you do to make their lives easier? Be willing to pitch in and learn new skills too if there's a challenging situation – a 'can-do' attitude will be noticed and it's a good reputation to have.



Courtesy of University of York

VFX is a team sport – so it is important to remember from the beginning that you don't have to be excellent at every aspect of VFX production.

“Just as important as your ability as a VFX artist or technician is your ability to communicate with those around you and take responsibility for your part in the shot/production you're working on. This ability can be forgotten when your head is down and you're involved with what you're doing. Think outside your box and try to understand the part you play in the bigger picture – it is probably the one most important thing that will help you get on in the business.”

Phil Dobree, Creative Director, Jellyfish Pictures

4.

VFX: WHERE EFFICIENCY AND CREATIVITY MEET

In order to understand the VFX industry and its operations you need to understand the underlying need for efficiency in image and data that is essential to making successful VFX.

The word efficiency has a bad press, sounding soulless and more than a little corporate but actually it is all about achieving the best quality in the time you've got.

When you create images or assets you need to complete the task to specification, not to perfection. Perfectionists only slow the process down because they can't let go. Think ahead; in most VFX work it's important to get the overall foundations of the problem worked out and get some feedback on what you have done before getting carried away with fine-tuning tiny details or adding polish.

It's important to understand the detail and amount of work needed to successfully fool the eye and get the job done. This often means finding appropriate solutions within the parameters you've got. As an example, there's no point using a processor-hungry particle system for a shot that features fog in the distance if shooting dry ice with a video camera will do the job. There's no point creating a complex simulation of a simple building falling down if a crafty animation will do the job more data-efficiently, or stock footage can be used.

It's important to remember it's not about reproducing the real world in 3D but mimicking it. Cheat creatively where you can to save processing power and rendering time. Work with simplicity in mind – unfortunately people often try to fix problems by adding more complexity. For instance, if your CGI lighting doesn't work, it's tempting to add another light, but this may have negative repercussions later down the pipeline.

Use 2D images, bake lighting and occlusion into textures, or render out elements in separate passes. You don't need to model the back of objects if the camera isn't going there! That's being efficient and saving time.

“A lot of the time I see inexperienced artists doing things just because they can – to show the world they can do it, whether or not it is required. A frequent example would be the desire to render motion blur and depth of field in 3D when it is very often better done in 2D. Don't be someone who only learns this the hard way – by waiting for a render that is never going to finish!”

Dave Cook, Head of CG, Jellyfish Pictures



Courtesy of National Film and Television School / Compositing Coach



5.

ITS NOT JUST ABOUT YOU, IT'S ABOUT THE PIPELINE TOO

VFX these days is about pipelines, not single software solutions. Your work often slots somewhere into a chain consisting of a multitude of complex tasks carried out by many others. Understand your contribution to the whole pipeline and what YOU need to deliver to make it work. What you do ripples out and has repercussions beyond just the next person in the pipeline. It's great to have an overview of the whole workflow; you'll win friends higher up the food chain by passing on work that is efficient and doesn't leave them with headaches. Try to second-guess certain issues or pitfalls that might cause problems later and solve them, building your work in such a way that it allows for the last-minute changes that you will inevitably be asked to perform so that revisions can be implemented quickly.

People are pipeline too! People are the glue that holds things together, so don't be afraid to communicate to others in the pipeline if you are unsure of what you need to create for them. Get to know who to talk to in the chain. Get along with the people who are in your pipeline – sometimes it pays to listen to their ideas and get their perspective.

For all the tech and people involved, it can be the simplest of things that can cause the biggest problems. Are you using the right file-naming convention? Will it be clear to the next person what you have done? Don't assume they are telepathic!

Breakdowns on your reel can be a good way to show you understand about pipelines – revealing the elements that went into the shot can tell recruiters you know what is important. Even if your shot is a team effort, your breakdown can emphasise that you have experience of a pipeline, no matter how simple.

It's often said students think about the end product they want too much and don't think through the stages of the process and how they can get there. This is ironic since it's the processes and planning you can show that will get you the job, not just the end result.

You can see an example of a pipeline on page 32.

“All large and many mid-size VFX companies require a complex pipeline in order to produce the hundreds of shots per month required for today's film industry. Understanding where your data is coming from and going to not only helps you but those around you. Communicating up and down stream can often be one of the most important aspects of your day.”

Matt Leonard, Lead Lighting Instructor, MPC



Courtesy of National Film and
Television School / Compositing Coach



Artifice

Courtesy of Felix Bauer-Schlichtegroll / Mohrag Taylor / Gordon Marshall / Nikolay Zorov / NNCA.

6.

DEADLINES REALLY, REALLY ARE DEADLINES

No, really.

At school and college sometimes deadlines can be stretched or deferred, but not in the professional world of VFX. You'll gain the respect of the whole team if you are dependable and hit your deadlines.

It's important to realise you can't work on any product to the level of perfection you might think it deserves. The allotted time is all you've got. There'll always be room for improvements, but that's not the point. Keep things simple. The encroaching deadline always trumps any work completed to your own level of perfection. Doing what's needed so the shot works is essential.

VFX is creative work and there's always a level of unpredictability involved. It's not unusual to work late or even the occasional weekend as deadlines approach.

It's useful to have a 'Plan B' if things don't go to schedule – what can you jettison to get the task done at the right quality? What are the shortcuts you can take? Can you use fewer textures or simpler shading?

Of course there can be a lot of pressure as deadlines loom, but there's also a real sense of satisfaction and achievement to be had from nailing the shot in time.

“My number one rule for deadlines? There's no such thing as a 'soft deadline'; each and every one is a 'hard' deadline because missing even one has a hard direct knock-on effect to your colleagues downstream and each is acutely felt.”

Lauren Knowlton-Parry, Head of Production, MPC

“Sometimes junior staff dive straight into a shot without thinking it through enough. That often means more fixes and ultimately more time spent on the shot. The old adage of 'more haste, less speed' is very true in VFX and will help you hit those all-important deadlines.”

Peter Rogers, Creative Producer, Bait Studio

7.

SOMEWHERE, THERE IS A CLIENT

In the industry it's about getting the shot right for someone else – not for you – and you need to be professional about it. You are working towards a client's satisfaction, usually communicated through your line manager. This doesn't necessarily mean your work is uncreative – there can be great interpretation involved; much leeway for the artist to put their mark on the work.

Completing the brief to the client's satisfaction is more important than what you may personally think is fantastic or finished.

At the end of the day, VFX is a service industry and you have been 'commissioned' to produce some work for a client and you are being paid to deliver that. If the client doesn't like what you have produced, it's usually down to personal taste or it needs to fit in with other shots in the film you haven't seen. Don't take it personally!

In certain companies, there's a skill in second-guessing and pre-empting the client's future comments or requests. They need to feel it is their vision, realised through you. There's little room for prima donnas in VFX – if you want to get paid!



Courtesy of
University of York

“Let's face it – you're going to work long hours sometimes under stress with complex software tools and a short time scale: sometimes it's hard not to take it personally. However, the work is not yours: it belongs to the studio and the director and they are going to make changes. When the going gets tough and you've changed the shot for the umpteenth time, remember you are part of a much bigger picture so don't take it too personally.”

Matt Leonard, Lead Lighting Instructor, MPC

“It's a good idea to try to educate yourself as much as possible about the client's taste. If they've directed other films, watch them. Have a look at what they've been approving and kicking back on the film you're working on. Do they like things subtle and underplayed or huge and flamboyant? Do they prefer gritty reality or stylised choreography? If you make something that looks like a natural fit for their kind of filmmaking, they're much more likely to approve it.”

Eugenie von Tunzelmann, CG Supervisor, Double Negative

8.

CRITICISM IS A REQUEST FOR CHANGE

Many new entrants find it hard to take criticism, because at university criticism is often diplomatically or sensitively presented and usually lacks blunt commercial imperatives.

A better way to look at it is to accept criticism as requests for change and not a slur on your sensibilities. Taking and adapting to criticism positively and dispassionately is of prime importance – leave your ego at the door.

Don't get attached to shots or think you'll gain brownie points for needless flourishes and embellishments. Part of this is accepting there's no right way to do a shot and your pet approach may not be the one required. There are always a few ways to achieve a finished shot and it's your line manager's call regarding which approach you should take. If he or she wants you to change those delicate and tasteful flourishes you spent hours putting into the shot with something you consider brash and vulgar, they're not being cultural vandals – they probably see the bigger picture and know what the client wants more than you do.

Don't get attached to a certain solution or a particular shot. It could be brilliant and yet still be cut from the film. The actual edit of a film is sometimes evolving as the VFX are created and this means certain shots may never be used. Get over it!

“Whilst it's always great to hear how happy someone is with your work, when someone tells you where your work can be improved that's when they can help you raise your game to the next level.”

Lucy Salter, 3D Artist Manager, Double Negative

All the people you respect in the industry got there because they treated the criticism they received as a vital part of their self-development and used it to progress to where they are now. Take a leaf out of their book. Don't shy away from being transparent about the work you are doing. Show it when asked. It's an opportunity to grow.

“Artistic direction and interpretation is subjective – you may produce some amazing work but it might not meet the client's vision. Don't take this personally. It happens to the most experienced artists.”

Stuart Penn, CG Supervisor, Framestore

Incidentally, in large VFX organisations HR appraises you on how successfully you respond to criticism and requests. Straight feedback and hard truths are the most direct way to get your work done, so don't expect diplomacy – there's no time for that.

“Learning how to interpret feedback is a key skill. Much of the time it's not about following the letter of the critique (like 'make that 20% brighter') and more about using your artistic eye to create changes that makes the shot feel 20% brighter. The best artists grow to learn how different supervisors deliver feedback and use their skills to provide them with the look they are after.”

Simon Jones, Head of Lighting – London, MPC Film

9.

EXPLAIN YOURSELF

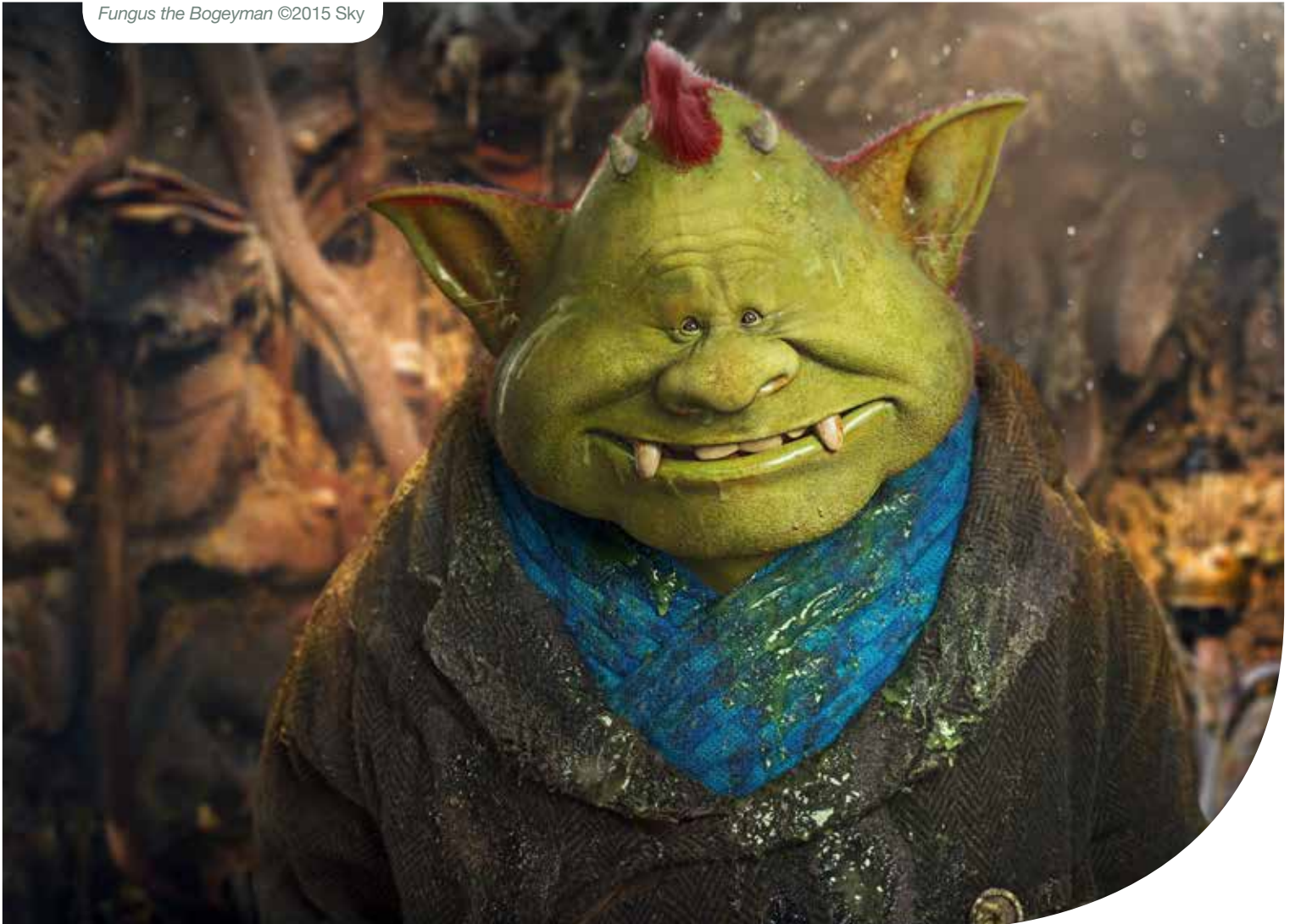
Get used to the idea of presenting your work and explaining yourself.

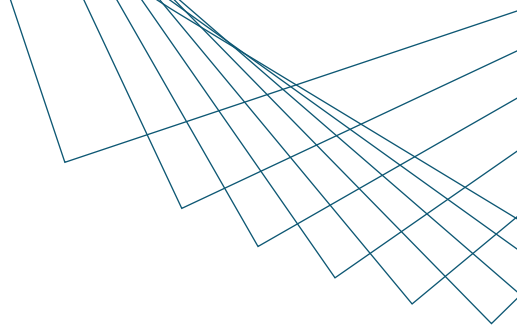
In a large team you may go to 'dailies' sessions and in smaller teams, informal desk-based review sessions may be involved. It is important to speak up in these sessions and describe what you have changed since the last time the client/supervisor saw the work and what decisions you have made on the way. You need to explain yourself and the strategy you are using to nail a certain shot, the journey you are on and where you are going; giving those around you progress

on what you have done thus far and how you will proceed. It's about having a narrative that allows others to have faith in what you are doing. You don't need to be a great orator – just tell it like it is.

Don't be afraid to speak up to your supervisors during review sessions. If you have ideas on how to make the shot look better or get it done quicker then say so, but don't take it personally if they want to take things in a different direction. A supervisor will be seeing a large number of artists and shots and there is a certain amount of 'selling' your work that you have to do.

Fungus the Bogeyman ©2015 Sky





Being honest pays, big time. It's human nature to try and cover up or ignore problems, especially if you think others will be judging your ability to do the job properly. In VFX, small problems easily snowball into huge issues as they pass through different departments and you need to understand that there'll be trouble further down the line if you don't communicate now. It's VFX karma.

“You are already a good speaker. When you are with friends or loved ones you speak in a comfortable, confident way that is engaging. The key to speaking to groups is to be the same comfortable, confident person you are when you're speaking one on one.”

Andrew Schlussek, Global Head of Training and Development, MPC

It's not a sign of weakness to ask for help when you are struggling. You'll be respected because you are ensuring the project keeps on track.

Also, be honest with regard to estimating time. A supervisor or other team member needs an honest overview of how long something will take in order to structure all other aspects of a shot/sequence/show properly. If you've got two days but you think it'll take four, tell them. They'll be much happier if you're honest so they can draft in some help and still hit the deadline!

Remember everyone makes mistakes and new entrants aren't expected to be the perfect, finished article.

“When you get into dailies and your submission comes up on the screen, tell the supervisors what you've done – what you've worked on in the shot (Animation? FX? Lighting?), how well you think it's working and what else, if anything, you'd like to do. Don't feel afraid to point out things you don't personally like about the work, or things where you feel you could do with some guidance. If you just sit in silence, the supervisors will comment on stuff you already know – and assume that you think the work is perfect. Not a good idea.”

Eugenie von Tunzelmann, CG Supervisor, Double Negative



Courtesy of National Film and Television School / Compositing Coach

10.

VFX AND THE PHOTOREAL: IS YOUR DRAGON REAL ENOUGH?

VFX is often about creating photoreal imagery, but only within the context of making the image believable and familiar within the world being portrayed. Gollum, Jake Sully, Davy Jones or Optimus Prime are believable because we feel they are photoreal within the world they inhabit, not because we've seen guys like them in the high street.

Believability is the key. A variety of image assets have to be integrated so they seem to conform to the same physical laws no matter how bizarre the juxtaposition. It all needs to look like it was shot in the same camera. This not only means you need to understand the visual and motion cues that make something believable – and the tell-tale elements that deny an image's believability – but also you'll often need to draw on a vast array of cultural references and the 'collective imaginary'. For instance, we all have an idea of what a fairy castle or a fire-breathing dragon needs to consist of, even though we've never seen one. Everybody carries an image library in their head of culture references and you'll need to tap into this from time to time.

Realising what works visually and how to mimic it are core skills across VFX. Why does something look real or 'right' and what factors are involved? Sometimes we see pictures on screen that instinctively don't look right and this can have dire effects when watching a film. Suddenly we 'opt out' of the illusion and become overly critical and nit picking.

Mimicry starts with observation. You should start by scrutinising and analysing natural phenomena. Light, colour, perspective, the physics of the everyday. Consider how much your work could be improved by paying attention to natural atmospheric, the interplay of light and surfaces, careful observations of shadows

and reflections outside your window right now. Observe elements like mist, heat haze or refraction and think about how you might apply them meaningfully in your CGI shots to help fool the eye of the viewer. Use your eyes before you use your computer!

Think about why certain scenes or shots create an emotional impact. How does the use of light, colour, perspective and other elements denote emotive conditions like fear, doubt or happiness? Being a good artist means using these cues to improve the shot and give it life – even if it's a zombie.

“For the most part, everything we do needs to be photoreal. All too often we try and remember what something looks like instead of going to the source – nature and the real world. Photo, video and live reference will serve us well as we try to recreate the world around us. However, a touch of movie magic may also be required to transform our shots from the ordinary into the spectacular.”

Matt Leonard, Lead Lighting Instructor, MPC

“When you learn how to be a feature film compositor, you will be learning how to become a forensic forger of photography and cinematography.”

Ian Murphy, Training Lead, MPC

“Believable VFX are all about constant observation. That new explosion may look really cool, but the public have an innate sense of what looks right or wrong physically. At some point the VFX can become noticeable and can detract from the story.”

Jason Harris, TD FX at Double Negative

“The hardest animation to do is that of a human; even harder is to give performance to a face. We are all ‘programmed’ from birth to understand the subtlety of emotion, intention and visual language through the face, without dialogue, as reading it wrong can be a life-or-death situation.

Even harder is to accomplish this in CG and apply it to a well-known actor that many throughout the world are used to seeing over and over again. Recreating a young Arnold Schwarzenegger in full CG form is what we had to do for *Terminator Genisys*. Doing so meant animators, modellers and riggers who had great understanding of facial muscle structure and performance painstakingly analysing various footage selections of the actor in order to bring the CG version to life.”

Greg Fisher, Global Head of Animation, MPC



Courtesy of MPC



Courtesy of MPC

11.

TAKING PICTURES

Get off the computer and look through a lens. Get a camera and get out there! Whether it's an old Nikon or your smartphone, you can get so much from looking through the lens and observing the world around you.

The art of photography helps you to look at surfaces and be sensitive to how light and shadow effect an image and – importantly – what a certain kind of lens can contribute to an image.

Don't feel you need to shoot anything exotic – there's no need to take a plane anywhere. Observe people, natural forms, even things on your street. Try photographing examples of the interplay of light on objects, how colours clash or match, how framing and focus can change how we feel about what we see.

“Study the world around you through drawing and photography. Artists who try to understand as much as they can about why things in the real world look and move the way they do are much more able to recreate them with a computer.”

Anthony Smith, VFX Supervisor, Framestore

“Photography is never perfect. Knowing how to appropriately degrade CG images to make them look like they were shot through a lens is what will take a shot from 95% done to being signed off.”

Anthony Smith, VFX Supervisor, Framestore

“Whether you're a lighter, texture artist or compositor, taking pictures and understanding how your camera works is a must. At the end of the day everything goes through a lens, be it real or digital and understanding depth of field, shutter speed, aperture, composition and framing will massively help your day-to-day work.”

Matt Leonard, Lead Lighting Instructor, MPC



12.

LOOK BEFORE YOU LEAP

New students often feel most comfortable diving straight in to the software to create work but without thinking ahead this often leads to calamity or unforeseen compromises later down the line.

Take a leaf out of industry's book and always take some time to think through what you are about to embark on. Being able to look ahead and dissect both shots and tasks into constituent steps or elements is a highly prized skill that needs to be worked on and will save you weeks of work on your course AND improve the quality of your work.

Take rotoscoping as an example. If you impetuously set off roto'ing from frame one you would soon come undone. Better to do what industry does and lessen your workload enormously by breaking your shot down into a series of overlapping shapes that lead to more automation and less individual frame-by-frame manipulation. Likewise, you can easily become entangled in a sprawling and inefficient composite if you don't think through how you might build it beforehand.

Also, why not plan things on paper before you start? This can help you get your ideas composed and help you figure out tasks before you get too bogged down in technology.

There's no one 'correct' approach to most VFX problems – just ones that may be more efficient and quicker than others. Drawing or simple sketching can help you work things out faster.

“The main skill you need is the ability to look at the real world and re-use observations. Artists have done this for centuries and it's no different now. That could mean observing the way surfaces behave in different lighting, or the way the face moves when talking. This should be the basis of everything you do – rather than being led by particular software to work in a certain way, you should have a goal and make the software do what you want it to.”

Dave Cook, Head of CG, Jellyfish Pictures



Courtesy of University of York

13.

DON'T WAIT TO BE TAUGHT

A VFX world tends to be a freelance world, so be aware of technological changes – keep yourself up to date as you go. Be self-motivated and don't expect in-house training (although plenty of places do it) to solve all your training needs. Keep in touch with developments in your chosen field through magazines, internet forums and blogs, software documentation, company websites, even SIGGRAPH and scour YouTube and Vimeo for tutorials.

“Make use of company VFX breakdowns and industry resources to see who is doing what. You may not have the experience but you will have the understanding.”

Anna Swift, Recruitment & Talent Manager, Framestore

We live in a world where you never finish learning and everyone in VFX needs to be proactive in keeping up to date. This actually can be great fun.

In quieter periods, never sit there waiting for someone to tell you what to do. Be proactive, find some meaningful work to do for the team and people will notice you.

“You'll often hear 'it's not the tools but the artist behind them' and that's true; however, an artist not knowing his tools can't be a good artist. Today VFX technology is moving faster than ever and keeping up can seem like a full-time job. Focusing in on a few key tools and learning them well is a very smart idea.”

Matt Leonard, Lead Lighting Instructor, MPC

14.

YOU'RE SURROUNDED BY EXPERTS

As a new entrant you shouldn't be scared to ask questions or admit you don't know something! Be forward – get info from others when you need it, instead of trying to hide what you don't know. It's not embarrassing to ask for information twice if you didn't get it at first. Your enthusiasm will be noted and your work will progress faster.

It's often useful to get to know different departments at work and to talk to those either side of the job you are doing to get an idea of what they need if you're not 100% clear.

Get to understand who around you has knowledge and expertise that you can tap into in order to get the task in hand done as quickly and efficiently as possible. It may be your line manager or superior, or maybe the person who's been working there for a bit longer than you. Ask respectfully and be sensitive to their workload – disturb them too often and their goodwill may disappear. Always read the manual or research problems online first.

One of the great things about VFX is you're rarely the cleverest person in the room. There's so much to learn

from others. In certain companies there are leaders or department heads who you need to follow. Identify those with greater experience and use them as role models without bugging them!

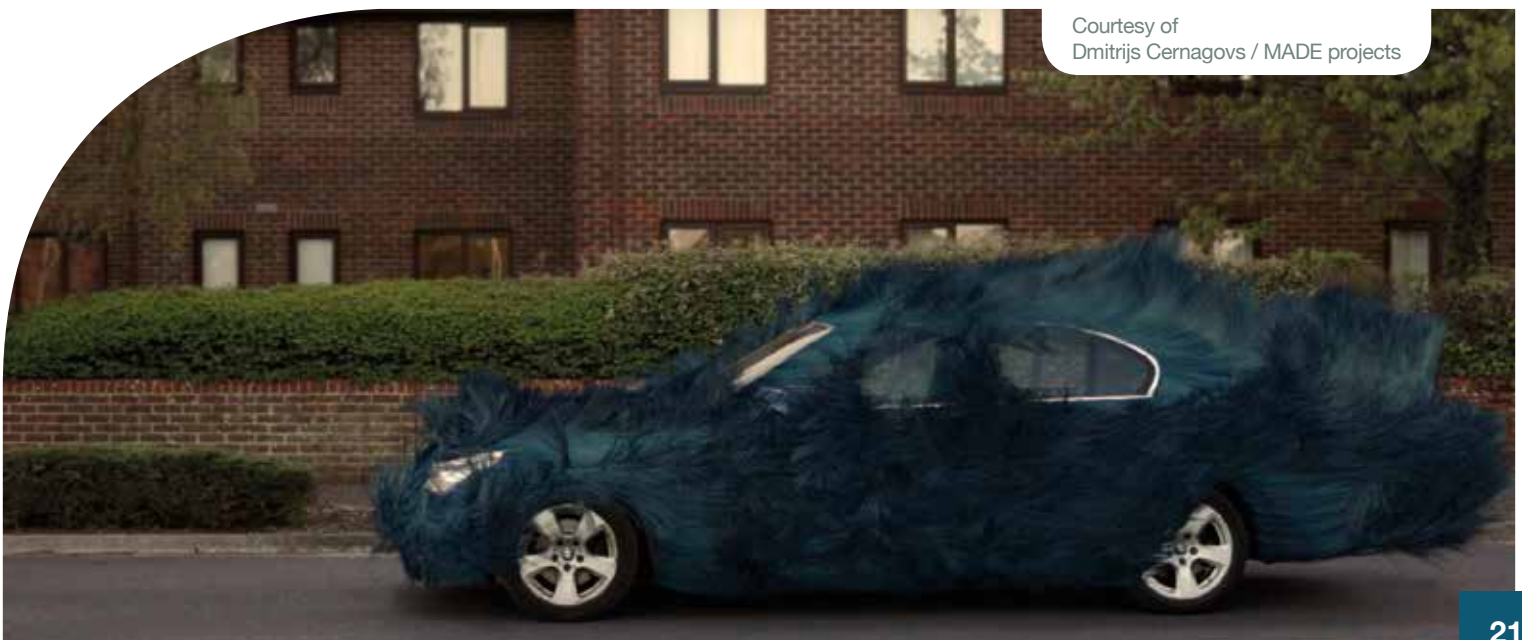
“Do you spend ages sifting through forums or a few minutes asking your colleagues? In VFX, the crew you work with are often the best source of solutions to the challenges you will face. Ask them before you ask Google.”

Anthony Smith, VFX Supervisor, Framestore

“As an FX TD I learnt so much from speaking to the software developers. That helped my understanding of the systems we use and this advanced my own work.”

Rob Hopper, London FX Head of Department, MPC Film

Courtesy of
Dmitrijs Cernagovs / MADE projects



15.

LEARN THE VFX ABC

As with any discipline or sector, across VFX companies there is a shared language that enables clear communication of concepts and day-to-day processes.

Get to know this glossary mix of acronyms, technical terms, film language, camera and film set jargon (so what IS the difference between zooming and tracking in?), IT language and slang. If you want to get on in VFX, speak like the locals!

“Don’t expect to know everything – sometimes even the experts don’t. VFX is a dynamic industry in terms of software, technique and challenges. There are always people around you that have different specialisms and experience who will always help.”

Stuart Penn, CG Supervisor, Framestore



Everest
Courtesy of Universal Pictures / Framestore.

16.

VFX IS CINEMA, ART AND MATHS

...and you can get in via any route! Essentially you need a basic awareness of the elements of cinematography, art and/or maths (logic). These needn’t be qualifications – if you haven’t studied all of these it’s not necessary – but an intuitive awareness and talent in any of these areas is a great start.

However, if you are not that curious about how screen media like films, TV programmes, animations or commercials might be constructed and don’t enjoy analysis, opinion and deconstruction of these, VFX might not be for you, whether you’re a science or art graduate.

It’s useful to also have an appreciation of all sorts of photography and painting – from which you can learn composition, balance, chiaroscuro, framing, implied motion and other concepts. Photography can help you observe and frame what is real and painting can help you appreciate what it takes to replicate and suggest reality.

“I came into VFX via a maths route and was really surprised to realise how valuable maths is in VFX – it’s been a really solid foundation for me, firstly with the logic needed in programming and also understanding the physical world we try to recreate.”

Lucy Salter, 3D Artist Manager, Double Negative

17.

MATHS? THAT'S NOT WHAT I EXPECTED

If you're an artist, don't worry – maths isn't essential (just as good drawing isn't essential for a programmer) but an appreciation of what you can achieve with maths will help you bridge the artist-techie gap.

“I think one of the most amazing pieces of maths that we work with in computer graphics is the transformation matrix. There is something magical about the fact that you can run a physics simulation on a bunch of little points that we call particles and at the end of the simulation you can ‘ask’ each particle for the information you need to correctly not only position, but also orient a piece of geometry onto it. This is how you get pieces of an exploding building properly moving through space and how you get debris tossed by a storm at sea to behave correctly. Not only is it embarrassingly easy to use, but the underlying maths really is quite elegant.”

Daniel Maskit, FX/Pipeline Supervisor, Double Negative

It's really about thinking logically. A bit of mental arithmetic can help you work out how mattes work, for instance. If you are into maths, our VFX advisors emphasised the importance of trigonometry, but also matrices, vectors, applied mechanics and basic algebra as examples of what is useful, as well as basic scripting.

It was also mentioned that a bit of knowledge about physics will help with 3D particle systems too.

“Understanding what the computer is doing internally (matrices, vectors, etc.) is as powerful as knowing how to mix colours and choosing the correct brush. Even a basic knowledge of the mathematical concepts will help you become a more powerful user of VFX tools.”

Tom Reed, Global Head of Rigging, MPC Film



Courtesy of National Film and Television School / Compositing Coach

18.

KNOW YOUR TOOL: THE COMPUTER

Computer literacy with UNIX/LINUX is essential in today's VFX house to the level of having a working ability to navigate, rename, launch applications, move files, safely delete, understand and use symbolic links (shortcuts) and be able to configure your environment to suit the show and/or shot you are about to start work on.

In some roles it is desirable, but not essential, to have a working knowledge of Python, C/C++ or other forms of scripting and programming.

Some suggest a brief understanding of the components of a modern computer – the CPU, GPU, graphics card and their properties and a firm understanding of your local drive and its relationship to a server or network. Hopefully you know where your wallet or purse is – but do you know where your images are? They are just as important.

It's not just a case of knowing where your files are, but what they are called. They need to correspond to the file-naming conventions of your workplace. Idiosyncratic names may make sense to you, but not to colleagues who need to use your work later. You'll need to appreciate the importance of naming protocols, conforming to them and how versions are named. Build project folders and directories ready to allow revisions and changes in the future by someone else. Different workplaces have different ways of doing this, but they are all crucially important. It's vitally important to avoid the implications of incorrectly labelled/named/stored files and the potentially costly and catastrophic consequences of poor file management.

If you're interested in computers why not build your own as a side project? You'll save money and learn a lot and it'll take away the mystique and awe.

“We all love our Mac and Windows machines, however VFX for the most part runs on Linux. Learning it is not the nightmare you probably think it is and with a dozen commands under your belt you can do a surprising amount very quickly. So download your free copy of Ubuntu and fire up the Terminal!”

Matt Leonard, Lead Lighting Instructor, MPC

“I was so lucky to have a Computer Science degree. It taught me to think in a structured way, making it very easy to see how to construct massive pipelines to deliver complex shows, even without writing a line of code. Having the confidence that you can deal with any technical problem the computer tries to throw at you is invaluable – particularly as others see this and start coming to you for help. Then, before you know it, you start moving into leadership roles.”

Gavin Graham, Head of 3D Department, Double Negative

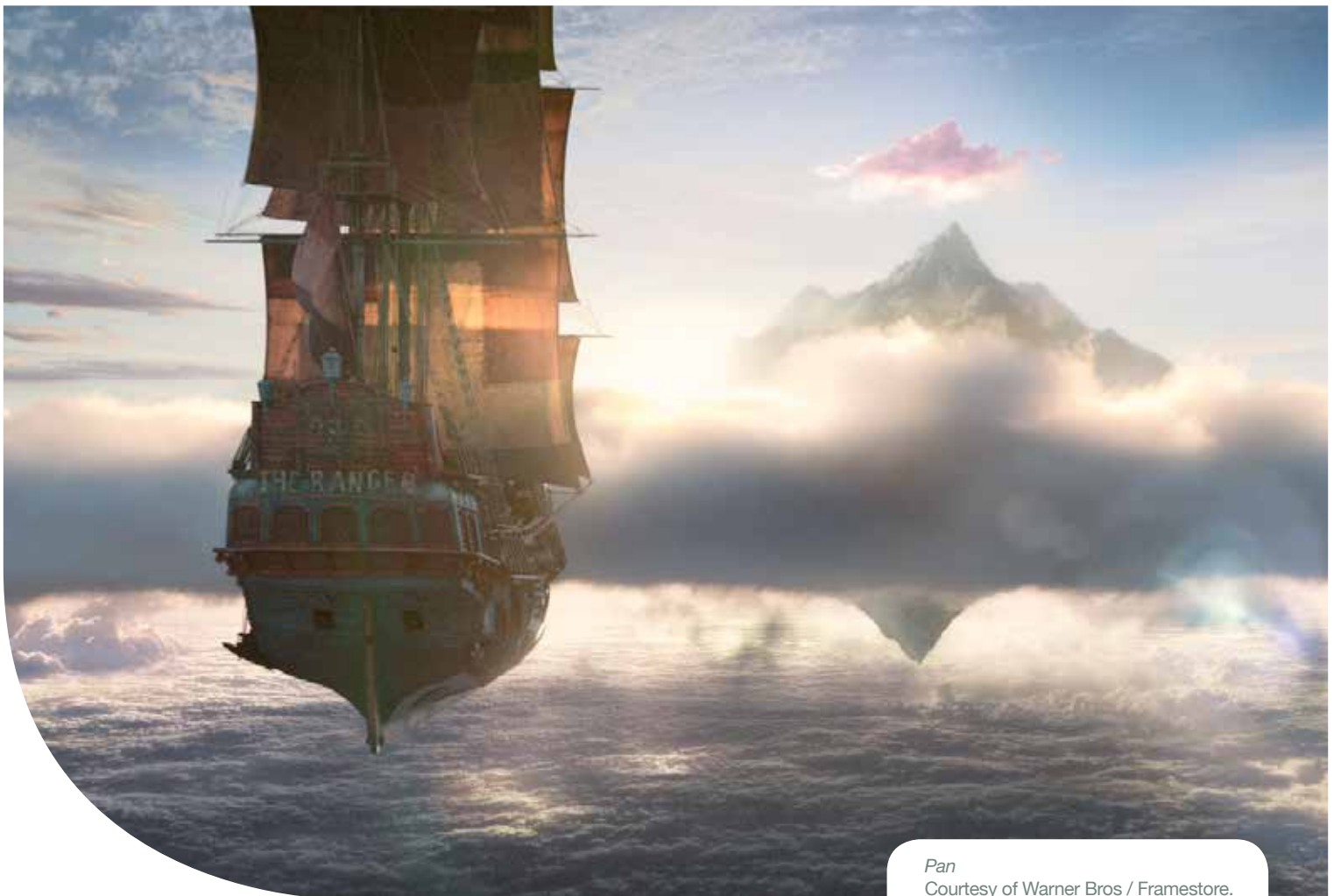
19.

FILM THEORY?

Knowing a bit about film or media theory can be really useful if you can apply it to practice. Awareness of how narrative structures and cinematic grammar impart meaning can be useful.

Great filmmakers know that different camera, lighting and editing decisions can communicate powerful meanings and emotions and in the films, TV shows and photography you watch you should start to

question why things are shot the way they are. Look at the shots and cuts in films at the cinema – why do they work? How are the colour and lighting references working to promote the story? How are your emotions manipulated? Look at the framing and composition in successful photographs – where is the eye being guided? You'll find you can use this same skill to heighten your VFX work.



Pan
Courtesy of Warner Bros / Framestore.

20.

VFX IS NOT NEW

VFX didn't start with a galaxy far, far away. It has a pedigree stretching back into early photography. Like any discipline, you can learn from the past. A sense of pre-digital VFX history and context can help you understand where we are now – culturally as well as technologically – and can open new insights into current practice.

“Despite popular belief, the VFX industry did not start with *Star Wars* in 1977. Movie effects go back to the early 1900s and more generic effects even earlier. Understanding this history will help with your present and future. So giving a little time to understanding things like optical effects, miniature photography and traditional glass matte paintings will go a long way to making you a better artist.”

Matt Leonard, Lead Lighting Instructor, MPC

21.

THE ART OF THE EDIT

Although your work in the industry is usually shot-based and so you are removed from the wider view of the sequence or scene you are working on, or how it might fit into the story arc, a knowledge of the principles of editing (note: we don't mean editing software) will stand you in good stead as you progress through your career.

Having a feel for how the construction and pace of different shots can engage a viewer and imbue tension or meaning is a bankable skill. It will also help you appreciate the job of editorial staff within the VFX workflow and how shots you have been working on can suddenly be modified or dropped.



Courtesy of National Film and Television School / Compositing Coach



Courtesy of Hollie Pearce / NCCA.

22.

STYLE AND VISION

VFX is proliferating and not everyone wants to work on a small section of a film time after time. There are plenty of indie filmmakers, animation directors, motion graphic designers, even games artists and architects using VFX techniques and software to achieve amazing images and styles. If these other paths interest you, start to develop your own style. Read up on graphics magazines and websites, watch the latest commercials from around the world, soak up style blogs and develop a look or signature. For commercials or promos, clients often want vision, ideas and stylistic flourishes. However stay adaptable – styles can become dated and outmoded.

“In the UK, you’ll find VFX work in Cardiff, Bristol and Belfast as well as London. Take the opportunity to talk to visiting speakers from industry about the ‘vibe’ and culture at the different places they have worked in”

Ian Murphy, Training Lead, MPC

“The future? HDR (High Dynamic Range) is an interesting emerging display technology – coming soon to broadcast TV and cinema. This offers a real improvement in image quality with increased highlight range, deeper blacks and increased colour palette to give more realistic representation of real world colours than we’ve previously seen on ‘traditional’ display technologies. This could create opportunities for VFX studios to generate ever more spectacular images with greater impact.”

John Frith, Head of Imaging, MPC Film

23.

OPTICS

VFX is experienced through an organ with particular foibles, limitations and properties – the human eye. Understanding how the eye works, how it can be fooled and even directed to certain areas of the screen, is useful.

How our brain interprets light that enters the cornea is a subject in itself. They say the brain is the most complex thing in the universe, but an experience of optical illusions will quickly give an idea of how visuals can be misinterpreted. As an example, colours can appear different depending on other colours that surround them. Tones too. You can see this in visual tricks like the Cornsweet or Ponzo illusions. It's an important thing to understand for lighting, compositing and for matte painting.

Our advisors say a little research into how we see won't go amiss. But they do mean a little. It's not like you can trade-in your eyes for a better model (yet).



Courtesy of
Bradford University

24.

REMEMBER TO HAVE FUN!

Most people in the VFX industry aren't sociopathic nerds who like to watch paint dry in their spare time. On the contrary, it's a very social industry. There's nothing like working together on great film or TV projects to make lasting bonds and friendships and as you move around companies you'll get to build an impressive social network. There's no work rivalry but a shared passion for VFX culture: film, comics, art, tech, humour. In some companies there are social clubs, Friday drinks events and even friendly sports competitions. There are also occasional celebration, wrap parties and launch events. By mixing with other staff socially at events you'll get to hear news and swap stories (while maintaining confidentiality) and build up a sense of what others in the VFX community are doing.

Whilst VFX isn't a 9-5 kind of job, everyone recognises that VFX professionals work better when they have an active social life. It's also good to celebrate when you've finished a tricky shot or completed work on deadline. Cheers!

"We always try to keep our artists involved in a wide range of social events. There's our softball team 'The Moving Pitchers', yoga classes, sculpture classes, life drawing lessons and various movie screenings and wrap events throughout the year. We share best practice with Tech Talks and every Friday take time to get together over a beer or two."

Jonny Vale, Marketing Manager, MPC

25.

NOW SURPRISE US

The history of VFX is still being written and relies on new talent to surprise us all. VFX has been surprising us since Alfred Clark's stop-action beheading of Mary Queen of Scots in 1895, through Méliès, Murnau and Lang to O'Brien's *King Kong*, Harryhausen's fighting skeletons, Trumbull's gravity-free atmosphere in *2001: A Space Odyssey* and through *Tron* and *Star Wars* into the digital era with John Gaeta's bullet time and John Knoll's *Avatar*.

But there are other low-budget surprises too – startling work like Uruguayan Fede Alvarez's *Panic Attack*, Alex Roman's *The Third and the Seventh* or Gareth Edwards' *Monsters*, or more underground hits like the video game lunacy of *Corridor Digital* or David Sandberg's *Kung Fury* that point the way to a new emerging VFX indie culture, beyond Hollywood studios and the mass global audience.

Now it's your turn to surprise us. We look forward to seeing what today's VFX students will create in the years ahead. Good luck!

“It's easy to think that all the key VFX milestones have been met and you're just a part of a well-oiled machine. However, with each new movie comes new challenges and the opportunity to help progress the industry forward toward a better tomorrow. So don't be satisfied with following the norm, think outside the box and maybe you'll be the next Dennis Muren or Paul Debevec.”

Matt Leonard, Lead Lighting Instructor, MPC



Everest
Courtesy of Universal Pictures / Framestore.

POSTSCRIPT 1:

A WORD FOR PARENTS AND GUARDIANS

Many of our industry advisors said their own parents didn't know there was a VFX industry in the UK, or didn't realise that maths, physics or arts backgrounds could get you a stable job with prospects in VFX. So we thought it would be good to compile some facts for your mums, dads, guardians or partners to reassure them you are on a great career journey and they should support you. Whisper these facts into their ear, or even better, show them this document!

- The UK has a mature and growing visual effects industry – in fact it's the biggest in Europe and possibly second-biggest in the world.
- It's a busy industry with plenty of opportunities. Recent films you might have heard of where the VFX were done in the UK include *Guardians of the Galaxy*, *Ant-Man*, *X-Men*, *Avengers*, *The Martian*, *Man From UNCLE*, *Gravity*.
- Industrial Light and Magic (those people who made *Star Wars* when you were a teen) moved offices to London so they could take advantage of UK VFX talent.
- VFX is not all explosions and sci-fi monsters. There's VFX in some of your favourite TV. It's done so well you don't know it's there. *Downton Abbey*, *Mr. Selfridge* and many period dramas use VFX regularly.
- It's not all about film. Architecture is one of the growth areas for VFX skills – architects need to have computer-generated views of the buildings they design and these skills are very much VFX skills.
- Learning VFX skills is a good investment in the future and increasingly in demand in interior design and anywhere where visualisation is common – medical imaging, fashion, the motor industry. This isn't an obscure part of the entertainment industry – the digital skills you use are in demand in many creative jobs.
- The Government recognises how important VFX is for our film industry and has created tax breaks to ensure Hollywood uses our UK facilities. This means film studios such as Pinewood and Elstree are busy and the UK VFX industry has a strong future.
- There are great progression prospects – many major VFX companies have top management who started as runners.
- We're rather excellent in the UK. UK companies won Oscars for VFX work in 2010 (*Inception*), 2013 (*Gravity*) and 2014 (*Interstellar*). We won BAFTAs for all these too, as well as for *Harry Potter and the Deathly Hallows* (2011).
- If your son or daughter really has their heart set on film VFX, it'll mean moving to London because that's where the film industry is centred. The magnetic pull is not so strong with other VFX areas – there are graphic design and small animation or video companies in many urban centres.

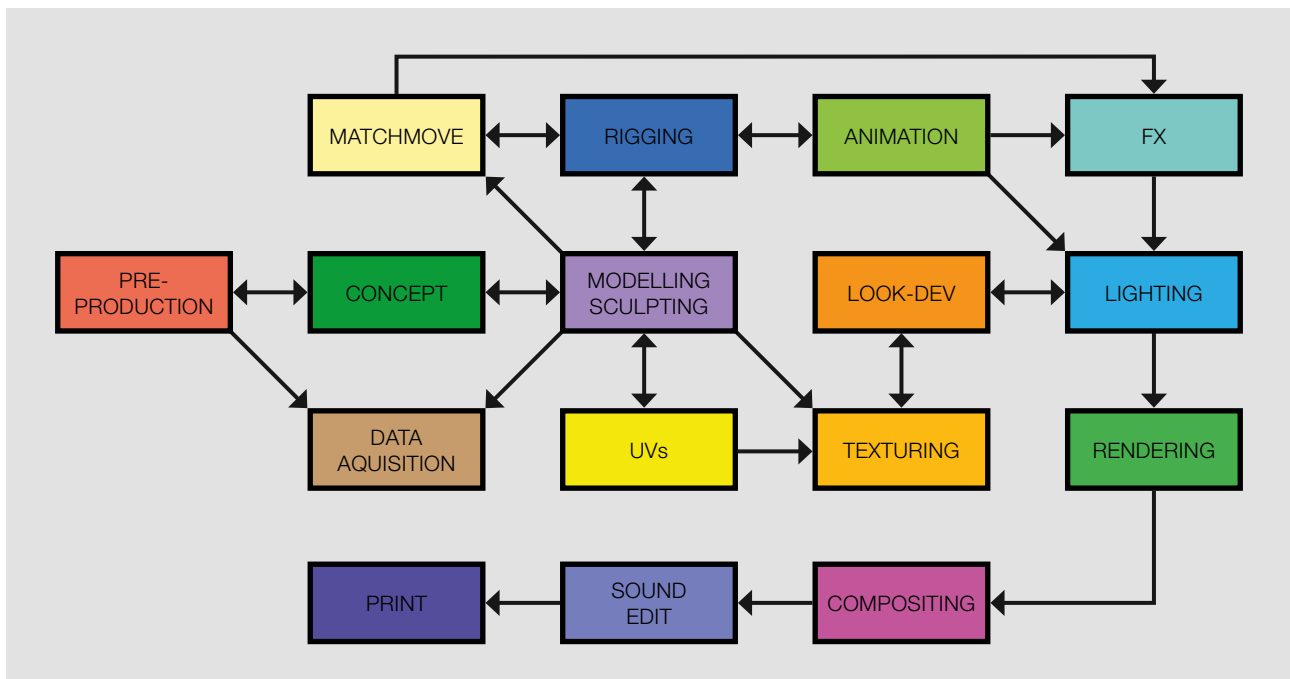
POSTSCRIPT 2:

SO, WHAT'S A PIPELINE?

A pipeline, as the name suggests, is the process that VFX work flows through to get from being an idea to a finished reality.

Many people might be involved at each stage. Pipelines can vary in complexity, but the important thing for beginners is to realise where they fit in and who might be affected later by your work. Tiny problems can get amplified as a flaw travels through, so it's often good to know who your neighbours are and talk to them if you have any issues.

VFX Pipeline Chart courtesy of Jahirul Amin, Double Negative 3D trainer.



Creative Skillset would like to thank the following VFX industry and teaching and learning professionals who were instrumental in feeding into this new edition of the Student Primer and Core Skills of VFX Repository:

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