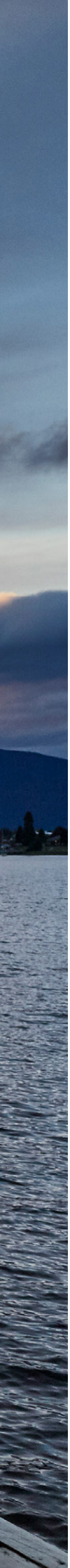
Pro-Photographer Guide

Long Exposure Photography in Depth

with Paul Reiffer

PHASEONE

what the world's best photography is made of



Prologue by Phase One

Meet Paul Reiffer

Paul is a professional landscape and cityscape photographer, Phase One Ambassador, and all around awesome human being. Beyond that, he is an extremely charismatic teacher and is well-versed in all things long exposure. Let's learn a bit more about Paul.

Who is he and how did he become a photographer?

Paul has had a camera for as long as he can remember. In fact, he still has his Kodak Disc 6000 8mm camera from his childhood, when his father had a dark room in the attic of his home on the south coast of England. We can only imagine the expanse of images he has taken, and the number of memories captured.

Paul gained interest in cityscapes while living in China. To that he says, "being on top of a city roof, capturing the lives of everyone below, is one of the busiest views, yet most peaceful places, I know in the world."

In 2013, he switched to medium format when his clients started demanding BIG prints. That was his revolution - from growing up experiencing photography in one way, to then learning a whole new world of opportunities was available.

Why is Paul qualified to teach you long exposure?

Paul's successful professional photography career is built on sweeping landscapes and busy cityscapes. He was the winner of the UNESCO International Year of Light competition with his shots of Shanghai, and his work has been exhibited all around the world - from the Royal Albert Hall and Houses of Parliament in London, to the largest screens in Times Square, and even a sandbank in the middle of the Indian Ocean. In order to deliver the absolute best to his clients, Paul frequently uses long exposure techniques to remove unwanted moving elements or create a desired atmosphere in his images.

Paul is also a passionate teacher of photography, leading exclusive travel workshops for dedicated enthusiast photographers interested in learning and honing their skills.

To learn more about Paul, you can visit:
www.paulreiffer.com

Introduction

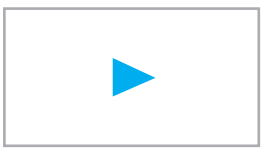
Have you ever looked at a powerful landscape image and asked yourself why you are drawn in? It might very well be thanks to long exposure. The use of long exposure techniques allows the photographer to keep the focus on the subject by effectively blurring elements of a composition which may divert the eye from the main subject.

Long exposure is a valuable tool for a photographer, and has many applications. In this ebook, with the help of Phase One Ambassador Paul Reiffer, we take a closer look at the essential equipment used in long exposure photography and understanding basic camera settings, and we apply this knowledge using concrete examples that Paul will walk you through, including valuable pro tips, so you will be able to go out and try the effect for yourself.

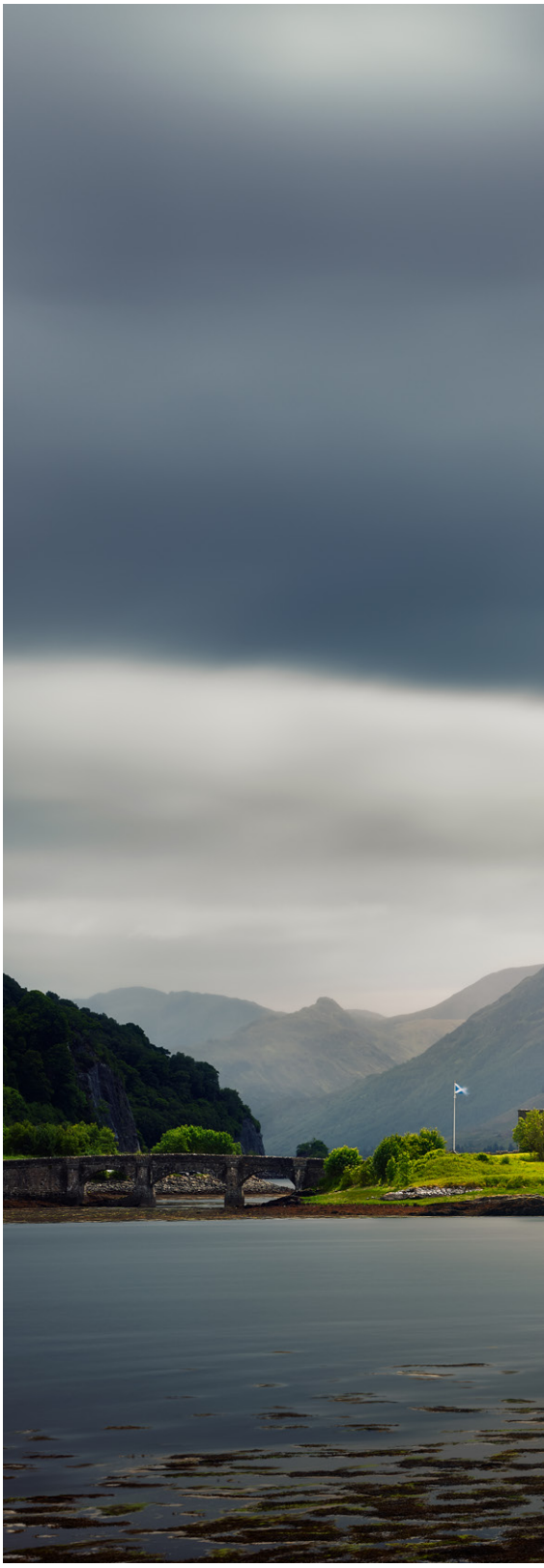
You will gain knowledge on how to achieve

- Silky water and cloud movement
- Light trails and light painting
- Brightening dark scenes
- Astrophotography
- Frame Averaging

This ebook aims to provide a foundation which will allow you to start using long exposure techniques in your photography – whether you wish to achieve silky water and blurred clouds, show the bustle of a busy city, capture the wonder of the northern lights, or find your own unique long exposure style.



Watch
Introduction
to this ebook

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Understanding essential camera settings

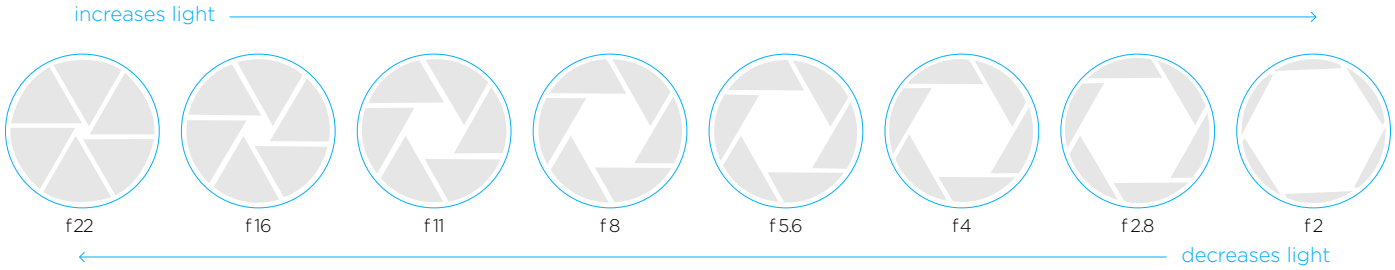
This section of the guide covers the essential manual capture settings - shutter speed, aperture and ISO - and explains how these settings interact to create a well-exposed image. If you are more advanced, you can skip to the next section.

Aperture

Aperture indicates how large the opening allowing light in is. Aperture controls depth of field in your image. A smaller opening – a larger aperture value – will let in less light and create a deep depth of field. A larger opening – a smaller aperture value – will let in more light and have less of the image in focus - a shallow depth of field. For landscape photography, you will generally want a deep depth of field, and therefore larger aperture values.

Aperture values are shown as f/X.X – for example, you may have a prime lens with an aperture of f/2.8. Or you may have a lens with a range of aperture values – for example, f/2.8-5.6. The upper value in that range is 2 f-stops darker. Light has decreased by half if the value has increased by one f-stop, or light has doubled if the value has decreased by one f-stop.

Watch
What is Aperture?



Why shoot manual?

Shooting in manual mode allows you to completely control the capture settings. In long exposure photography, this control is essential in order to achieve the intended results.

Watch
Why shoot manual?

Why shoot RAW?

A RAW file contains all captured information with no compromise, leaving you with the most flexibility when it comes to post-processing.

Shutter Speed

The shutter speed indicates how long your sensor is collecting light. A fast shutter speed will freeze action, but let in less light, whereas a long shutter speed will blur moving objects and let in much more light. By adjusting the shutter speed, you can brighten or darken the captured image. A fast shutter speed will ensure a well-exposed image on a bright, sunny day. A slow shutter speed on that same bright, sunny day would result in an overexposed image. You can also use shutter speed to freeze action (fast shutter speed) or blur moving objects (a slow shutter speed).

Shutter speed is written as a fraction of a second – for example, 1/125 is 0.0125 second.

Watch
What is shutter speed?

ISO

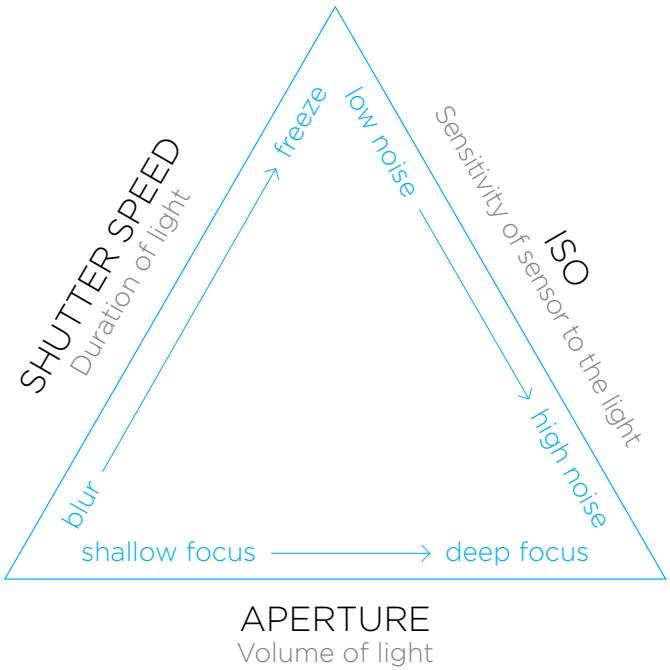
The ISO value indicates how sensitive to light your camera's sensor is allowed to be. A low value is less light sensitive, whereas a large value is more light sensitive. This means that by increasing ISO, you are able to brighten your image. This is useful if you would need a longer shutter speed at a low ISO to get a well-exposed image, but you have a moving element in the scene that you would like to freeze in action. You can then increase the ISO, and decrease your shutter speed. However, increasing ISO introduces noise into your image. So for most long exposure photography, you will want to keep your ISO as low as possible to reduce the amount of noise recorded in your image.

Watch
What is ISO?

Putting it all together

Shutter speed, Aperture and ISO all work together to create a well-exposed image. Together, you can think of them as a triangle that you need to keep in balance. If you adjust one to get a certain effect, then you must adjust the others to compensate for the change. We just talked about keeping ISO as low as possible for most landscape photography, you have two options to increase the amount of light that reaches your sensor. In long exposure photography, you will use a combination of both aperture and shutter speed to achieve specific results for the type of effect you are aiming for.

Watch
Understanding exposure



Essential Equipment

Long exposure photography requires a unique set of equipment. To achieve the effects covered in this ebook, you will need:

A camera with manual settings

Most DSLRs and mirrorless cameras offer this, but we recommend an XF IQ4 Camera System, or IQ4 Digital Back on a technical camera solution.

Remote shutter

This is necessary if you will be using Bulb mode. On the XF Camera System, a remote shutter is not necessary thanks to vibration control tools, Capture Pilot app, and exposures of up to 60 minutes.

Neutral Density Filter set + Holder

Paul uses Rollei FX: Pro series filters because they come in both 100mm and 150mm sizes and can be used on both his XF Camera System and technical camera.
To hold the filters in place, Paul uses a mix of both Rollei custom holders for his XF lenses and Wine Country Camera's 150mm holder system – both prevent light leaks and ensure a secure fit for each filter.

Recommended filters:
Solid ND filters: ND8 (3 stop), ND64 (6 stop), ND1000 (10 stop) Graduated ND filters: Soft GND8 (3 stop), Medium GND8 (3 stop), Soft GND16 (4 stop).

Sturdy tripod

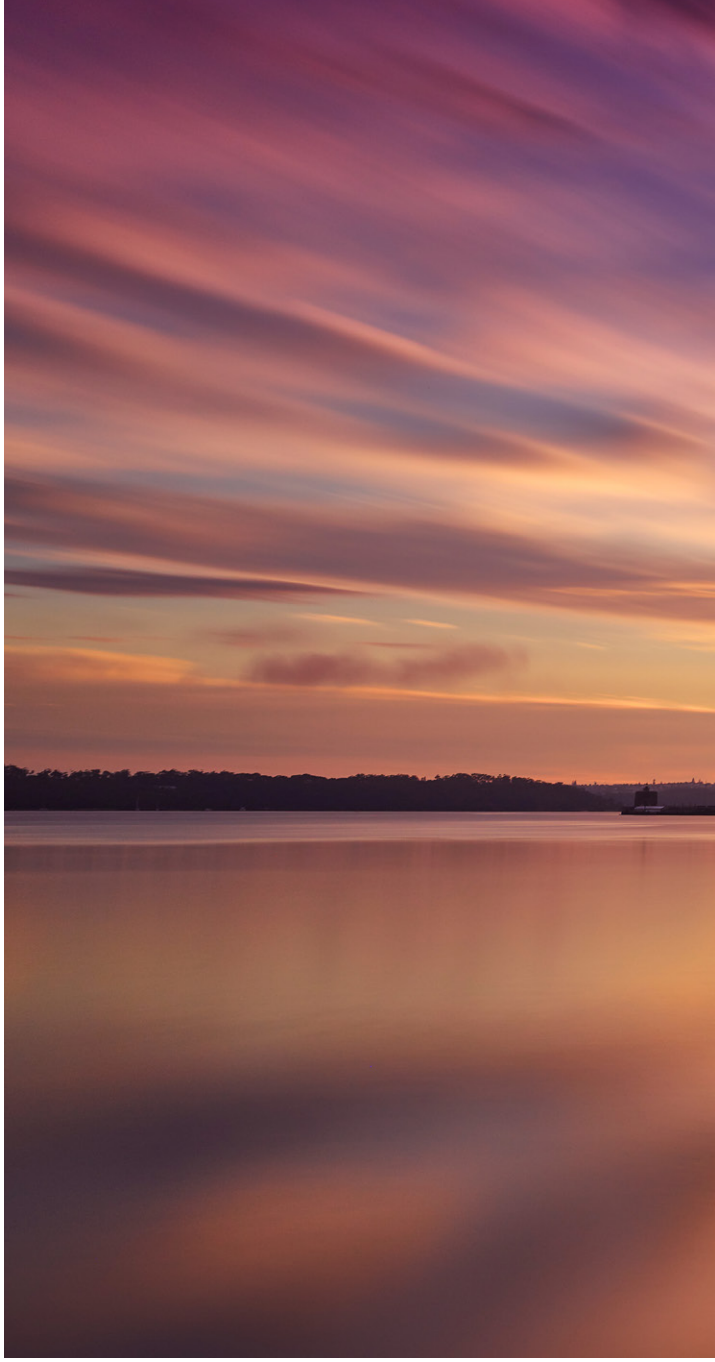
Paul uses the Rollei Lion Rock Mk II 25 and 30 tripods because of their durability and lightweight, small, pack-size.

A light source

Flash light.

Pro Tip
Choosing Filters

Silky water and cloud movement



Introduction

Where we meet a scene with moving water or clouds, it's possible to use a long exposure to capture that motion in a still image. Depending on how much available light is in the scene, we can use an ND ("neutral density") filter of varying strengths to limit the amount of that light entering the camera for a given aperture, resulting in slower shutter speeds than would normally be possible. This technique could apply to movement above an iconic landmark, a natural landscape or a cityscape during golden hour.

For this tutorial, we're using an example captured just after sunrise.

Equipment Needed

- Camera
- Tripod
- Shutter Release
- ND Filters – a range of both solid and graduated

Setting up the shot

- First, we'll compose the scene with our subject on the 1/3 line, aiming for the motion of the clouds to give us a leading line towards it.
- If necessary, we'll use a graduated ND filter to balance the light across the scene – darkening the top section of the frame by 2-3 stops (in this case, it's a 3 stop soft graduated filter in use – meaning the top of the filter is 3 stops darker than the bottom, which is clear.). Without this filter, we'll struggle to expose the entire image correctly.
- Once we're satisfied with the composition and exposure across the scene (checking for any over/under exposed areas), we'll take a test shot at our desired aperture. This gives us our base exposure.
- Next, we'll take that base exposure (in this case, 2 seconds) and work out how long we want our final exposure to be. Given how slowly the clouds were moving, we wanted a 2 minute exposure (120 seconds), so we divide our target exposure by our base exposure to give the amount of extra Neutral Density we need to apply. In this case, 120/2 = 60, or roughly 6 stops. ND filters come in varying strengths and are labelled as either their density (0.6, 0.9, 1.2), stops of light (2, 3, 4) or ND value (4, 8, 16). The closest filter we can use in this case is a 6 stop filter, labelled as "ND64", "6 stops" or "1.8".
- Add the ND filter in the slot closest to your lens, with the graduated ND filter we used before in the next slot, nearer to the subject.

Capturing and improving the shot

Ideally, we'll be using either a remote shutter release (either cable, or wireless) or the built-in vibration delay on the camera itself to avoid any shake when we click the shutter button to initiate the shot.
Where possible, the use of an electronic shutter will also help prevent any "mirror shake" from the mechanical movements inside a DSLR system.

Once captured, try experimenting with different exposure times – if the water is too "milky", try a shorter exposure. If the clouds aren't moving enough, try a longer shutter – in both cases, adjusting the ND filter in use to accommodate your new settings.

Post-processing

No filter is going to be 100% perfect at controlling highlights or shadows across a diverse scene. With this in mind, using software such as Capture One Pro to maximise the camera's dynamic range by recovering highlights and shadows can help to bring every detail in the scene back to how you remembered them.

To add a "pop", a small amount of natural "clarity" (up to 20 on the slider scale) helps with definition, and use the "levels" tool to ensure your shadows are deep, rich, dark tones while highlights are bright enough to stand out when printed against a white mount/background.


© Paul Reiffer


Crop 100%

Light Trails and Light Painting

Introduction

So here we are at night – on a rooftop in Shanghai, China, with an incredible view beneath our feet. The only challenge is, how to best capture it – we have bright highlights, dark shadows, moving light trails from the cars and changing colours on the "rainbow road" of the city's Nanpu Bridge. That's a lot of mind-juggling to do before we get started!

Equipment Needed

- Camera
- Tripod (and something to weight it down if windy up on the roof)
- Remote Shutter Release (or timed delay)

Setting up the shot

In this shot, there are three opposing challenges:

1. We need to keep the shutter open long enough to capture the long light-trails of the car headlights and rear lights as they follow the circular road.
2. We need to keep the shutter speed fast enough to not allow the rainbow colours to change too much – if the camera sees all the colours of a rainbow from one point, it will simply expose it as white light (remember, light is additive – R+G+B = White)
3. We need the overall scene to expose correctly and capture all the details in the streets while not over-exposing the highlights themselves.

So, some of this comes down to trial and error – and a little bit of practice. In this case, 35 seconds was the magic number to allow enough traffic to move in order for our light trails to appear, while not being so long that the rainbow lights on the road would "wash out" to white. Using an aperture of f/11, at ISO 35, that timing gave just enough to the shadows to bring out the details while not quite clipping the highlights in the concrete towers.

Capturing and improving the shot

Be careful shooting at rush-hour – cars that start and stop are a nightmare for smooth light trails!

I'm always looking out for an indicator signal (with its yellow dashes) or a police car in the frame with its red and blue morse-code streak across the trails – they can be annoying, or an interesting feature, depending on how you feel at the time.

If anything, this is a true "expose to the left" situation – while it's normal for the individual light trails to be over-exposed, we need to be able to separate them to see that they are different vehicles. If anything, aim to slightly underexpose the base image and use the dynamic range of your camera in post-processing to pull up the shadows.

Post-processing

In the raw image, the towers seemed a little bit overexposed but the dynamic range of the camera soon delivered the shot once "highlight recovery" was enabled in Capture One.

Using a base reference iPhone photo, I could match the white balance to the actual evening, and boosted the contrast a little to ensure the image really "popped" on-screen.

Watch
How to compose a nighttime cityscape

Dark Scenes

Introduction

The midnight sun – Iceland – where we're treated to 3-4 hours of sunset each night.

When shooting in low light, we don't necessarily need a filter in order to extend our exposure time – but in this case, we need a mixture of natural long exposure, combined with two filters to really make the image work. One to extend our exposure time a little more (a solid ND8 filter) and one to darken the sky to allow the shadows in the waterfall to be visible (a graduated neutral density filter – 3 stops/GND8)

Equipment Needed

- Camera
- Tripod (and something to weight it down if windy)
- Remote Shutter Release or delay timer
- Filter holder + solid and graduated ND filters

Setting up the shot

We're going to load in a graduated filter first of all, to allow our exposure to be more balanced – allowing the camera to see deep into the shadows in the foreground at the same time as not overexposing the sky where the sun hits the horizon.

With that filter in place, we'll look at our exposure time for our desired aperture. For fast-flowing water, any exposure

longer than half a second will show that movement, but in this case we also want to blur the movement in the rough water in the lake below – as such, we'll add a solid ND8 filter to slow things down even more, allowing for several seconds of exposure time to get the perfect smooth look.

Capturing and improving the shot

Experiment, experiment, experiment!

There's a fine balance between enough time to smooth out the water, but not so much that our clouds blur (and not in a good way). Try longer, try shorter, and experiment with the graduated filter's coverage too. When using a GND filter, remember to rotate the filter to follow the line of LIGHT – not just the horizon – to get the right look.

Post-processing

With stacked filters, there is a risk with some manufacturers that "colour-cast" is introduced (from green to magenta).

In this case, you'll need to adjust the "tint" in Capture One to correct for this, getting back to what you saw.

Check for water spots on your final image – spray has a habit of landing on filters and lenses, a quick dust removal tool will fix that right up.

Watch
Compensating
for differing light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Astrophotography

Introduction

Astrophotography is a photographic genre in its own right, with specialized equipment and an incredible array of different methods, ranging from trackers that are calibrated to follow the galaxy through the night to ultra-sensitive technical cameras which are able to see more than our eyes when photographing the stars above. But oftentimes, the "wow" pictures come from the simple placement of an interesting foreground against the night sky. Using the same principles as with other long exposure photography, it's easy to work out the settings we need to achieve the right look.

Equipment Needed

- Camera
- Tripod (and something to weight it down with if windy)
- Shutter Release

Setting up the shot

With such a dark scene, we need to get our aperture as wide as possible (ideally f/2.8 or wider). We also want the shutter speed to be short (no longer than 20 seconds), to avoid getting stars looking as trails of light instead of dots. With those two variables so limited, we're left with using whatever ISO we can get away with – to capture enough of the stars and as little noise as possible. We'll be working with ISO1250-1600, depending on your camera's sensor.

Then, it's all down to the framing. If we're able to include the "galactic center" – those tightly packed stars that appear during certain months – it can immediately increase the level of interest in the shot. But we also need a foreground, so focus on finding an interesting subject and then place the galactic center around it.

Capturing and improving the shot

As with sunset shooting, astrophotography requires a lot of patience. It's all about balancing variables and hoping for the best at the exact time you want to shoot. It may take several attempts, over many nights, to get the right shot, so be ready for that! Try to shoot during little or no moonlight, so you can "light paint" the subject. To do this, start your long exposure and then experiment with bathing the subject in a torchlight for a few seconds. For a brighter subject, use more light for longer – if it's too strong compared to the stars behind, just dial it back a little.

Post-processing

Auto-white-balance on cameras generally produces astro images which are a little too warm. By shooting in RAW, we can cool them down (to around 3200K or below), for an accurate representation of the night sky.

Use the noise reduction in your processing software to reduce any remaining unwanted artefacts. Be careful, sometimes the software sees smaller stars as noise and tries to delete them!

Watch
Basic astrophotography

Frame Averaging

What is it and do I need the IQ4 to do it?

Frame Averaging is a technique wherein you shoot a series of images, and then in post-processing combine the images - averaging the content in each pixel. It is a way to achieve a longer exposure image without filters, or as a method to remove unwanted subjects in the frame – for example if you are at a popular tourist location and want to have an image without people.

Phase One has taken this technique and re-imagined the workflow and the fundamentals of what a digital single shot image can be. The Automated Frame Averaging tool in the IQ4 captures, and automatically combines, a sequence of images that you define into a single 16-bit RAW file.

Watch
Frame Averaging
with the IQ4


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Bonus - How the cover image was shot

The story of how the image came to be

There's always that one shot, for every photographer out there – "the one" that just keeps getting away, the one that's never quite right when you click the button, or the one that's impossible to find the right conditions to capture. For me, that shot has been the same for over 9 years now: San Francisco's Golden Gate Bridge in the fog.

Finally, one random winter's afternoon, I managed to break that spell.

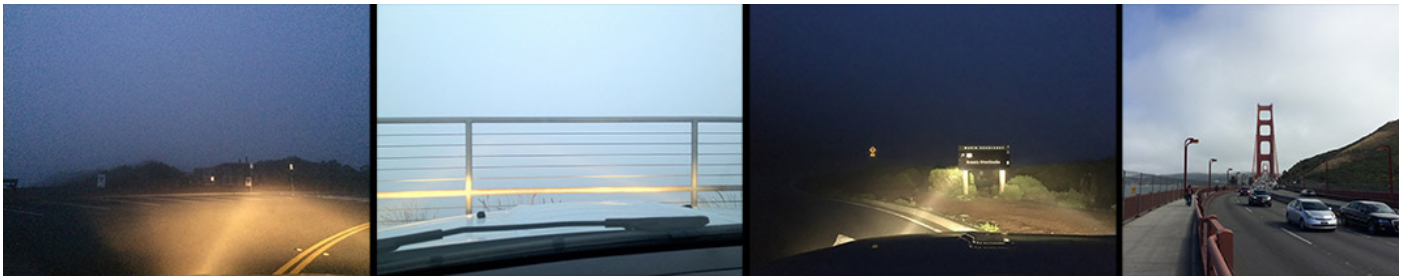
What could possibly be so difficult to capture in this shot? I mean, it's San Francisco, the city that's known for its fog, right?

Well, yes and no. You see, while San Francisco itself can be reliably foggy, I had pictured a specific look where the bridge was still visible but with a sweeping fog bank moving through the Golden Gate.

Since 2006, at every opportunity I've had in the city, I've driven up to the spots along the Marin Headlands, just north of San Francisco itself. Sunrise shots meant leaving at 4:30am to drive across the toll bridge in the dark and be met with either not enough, or way too much, fog on the other side of the hill. Sunset forecasts for fog and mist meant constantly missing dinner plans. Daytimes just became a lost cause with the fog bank turning into thick cloud instead, and the toll charges alone must have cost more than $200 in attempts over the years.

So, what made this time special?

The simple answer is "nothing". Nothing at all.
In a city that has such changeable weather patterns, this shot simply comes down to one thing: Luck. Being in the right place at the right time, nothing more, nothing less. Yes, the equipment and filters I'm using help – but in reality, this was the first time in all those years that I'd even seen the fog sitting "just right".



It's absolutely the case when it comes to weather that every "perfect scene" can be ruined by too much, or too little, of a good thing. Sunsets often need cloud to really stand out – but too much, or too little, and it's a bust. Long exposures need a breeze for motion in the sky – too much, or too little, and you're either holding on to your camera in a storm or running 10 minute exposures to see any movement. For fog, the same rule applies – I've seen too much fog, as well as not enough, and in both cases it resulted in me not even removing my camera from its bag.

Arriving in Marin, despite there being a lot of the white stuff hanging around the gateway to the ocean, there was simply too much to get any detail and the bridge itself was constantly being obscured. To give up and carry on the day, or stick around and keep trying? A question that's easily answered when it's your 30th or so attempt at the shot and the closest you've seen the weather to being "well behaved" – we held on...

And then, like a clearing in a movie, the scene began to slowly clear. The temperature difference brought with it a breeze that kept the fog moving over the hills in the background, but it was still light enough to not disturb the camera. The glare from the sea when the sun reflected back needed a CPL filter, but with a heavy ND and ND-Grad filter added to the mix, I could keep a long exposure of the scene while balancing the extremely bright fog against the shadows of the Golden Gate Bridge itself.

Finally, I had it on my memory card, and wow that felt good!

Equipment and settings

645 DF+

IQ2 80MP Digital Back

Schneider Kreuznach 28mm LS f/4.5 Aspherical

ISO 35

f/25

30 seconds

Epilogue

by Paul Reiffer

It's been an absolute pleasure sharing my knowledge and a few stories with you. Long exposure photography can deliver images which allow the viewer to feel the movement, the motion, the excitement or serenity of the landscape and cityscape scenes that you capture.

While each photographer has a different approach and style when it comes to long exposures – and photography in general - once the basics of lighting control and shutter speed manipulation are grasped, every photographer can use these techniques to continue to create even more unique and inspiring scenes, no matter how popular a location may be.

My hope is, even if you're very experienced in the field, there's been something in this guide that has either helped or inspired you to try something new.

So, get out there, try some of the techniques in this eBook (or experiment even further with some modifications) and find your own workflow and style as you uncover the wonders of applying the concept of long exposures to your images.

Happy creating!

Watch
Why Paul uses Phase One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IQ4 Camera Systems

with Paul Reiffer

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