

HDR Photography

The What, Why & How

WHAT IS IT?

- Technique of blending multiple different exposures of the same scene to create a single image with a greater dynamic range than can be achieved with a single exposure.
- Can be done with as few as two exposures or as many as nine.
- Although it can be done with layers and simple blending or masking techniques, it is more common to use specialized programs or plug ins that automate the process.

WHY BOTHER?

- The dynamic range of ALL cameras is much smaller than the dynamic range of a typical sunlit scene.
- Cameras can capture a dynamic range of 5 to 7 stops.
- A bright sunlit scene with shadows might have a dynamic range of up to 22 stops.
- Remember $DR = \text{Contrast}$!!!!

The Fundamental Problem

- How do we fit all of the 22 stops of a scene into the 7 stops our camera can capture? WE CAN'T!!!!
- Overcoming this problem is the reason for many of our tricks and techniques that lower the contrast between the darkest and lightest parts of the scene to reduce its DR to something our camera can capture.
 - Graduated filters
 - Light Bouncers & Diffusers
 - Fill Flash and other artificial light
- We are adding light to the shadows subtracting light from the highlights to reduce the DR.

HDR IS DIFFERENT

- Instead of reducing the DR of our scene to something the camera can capture we combine multiple exposures after capture to produce a single image with a greater DR than our camera can capture.
- This does produce some of its own drawbacks that we will discuss later.
- Computational photography.
 - Modifying images at the data level.

HOW DO I DO IT?

- Two main steps:
 - Capture a series of different exposures of the same scene.
 - Process those exposures into a single image on your computer.

CAPTURE: What do I need?

- Digital camera
 - Almost any camera can be used.
 - Almost any file format (Raw, Tiff, Jpeg) but Raw is recommended unless it is a unusual proprietary format.
- Good tripod and head
 - DO NOT use bargain basement tripods and heads
 - Can hand hold, if you are only going to capture a series of three exposures and your camera has a burst mode.

CAPTURE: Technique

- Decide how many exposures you want to use.
 - Depends on the DR of your scene, any movement and whether you are handholding.
- Decide what the change in exposure between shots is going to be.
 - Most people tend to change the exposure by one stop between shots but you can go as high as 2-3 stops particularly if you are in Raw.

CAPTURE: Technique

- Decide how many exposures you want to use.
- Decide what the change in exposure between shots is going to be.
- Decide how you will bracket your exposures.
 - Most cameras have some form of auto-bracketing.
 - Can bracket manually if you have to.
 - Always (almost) bracket by changing shutter speed, not exposure!!!!

CAPTURE: Settings

- GOAL – Capture a series of photos that are as similar as possible except for the exposure.
 - Exposure mode – manual or aperture priority
 - White Balance – anything but Auto
 - ISO - Manual

CAPTURE: Movement

- Goal is NO camera movement.
 - Tripod
 - Cable release
 - Mirror lock up
 - Good technique
 - Fast shutter speeds and burst mode
- Most HDR programs can handle small amounts of camera movement.

CAPTURE: Movement

- Goal is NO camera movement.
- Movement in the scene
 - Scenes with a lot of movement are not typically good candidates for HDR.
 - Most HDR programs can handle movement such as leaves and running water.

CAPTURE: A suggestion

- Before starting your sequence, shoot one shot of the lens cap or the back of your hand. When you are looking at your thumbnails, this will make it easy to determine where the sequence begins.

Processing

- Before HDR programs, some PS'ers could expand the DR of an image by combining 2 or 3 exposures as different layers and using blending or masking techniques.
 - Use the sky from one image and the foreground from another.
 - Still works, but is time consuming and tedious.
- Number of programs and plug ins that automate this process.

Processing: Two Steps

- Exposure Blending
 - Fusing the more exposed (lighter) data from one photo with the less exposed (darker) data from another.
 - The problem is that this almost always creates a file that cannot be portrayed on any monitor.
- Tone Mapping
 - Instructions to the computer on how to interpret all of the exposure data.
 - Tells it how to fit it into the DR the monitor can display.
- Most current programs perform both exposure blending and tone mapping automatically.

OUTPUT

- The main drawback of HDR.
- HDR produces files with DRs that can exceed the ability of monitors to depict them and always exceed the ability of printed media to depict them.
- Again, you are faced with the dilemma of fitting too much DR into a smaller bucket because generally for DR:
 - Output file>Monitor>Aluminum Print>Glossy Paper>Matte Paper
 - You have to choose the right balance of shadows and highlights for each output!

THE FUTURE

- In camera HDR.
- Improved sensors capable of capturing a greater DR.
- New camera designs such as the Lytro.
- Improvements in output media.