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Handout 9 – High Dynamic Range Images (HDR)

Both Film and Digital cameras are limited in the dynamic range they can capture. Roughly they capture a ten-stop range. Have you ever taken a photo indoors only to have the windows blow out? And if you expose for information outside the windows, the interior of the room becomes too dark. In this situation the dynamic range of the scene is to great for the camera to record. There are three ways to remedy this situation, either bring in artificial lighting to increase the exposure inside the room, manually composite the shot from several exposures, or use the HDR technique.

In the right hands, High dynamic range imaging can blend multiple exposures of the same scene to more closely reproduce what your eye can see. Here's how to do HDR the right way.

So when should you use HDR? It's simple: when you're trying to capture a scene with a wide range between its lightest and darkest areas as accurately as possible. HDR images are created by combining the pixel information from several pictures into one 32-bit file that contains the full dynamic range of each of the individual shots used to create it.

Take a look at range of shots I provide you of a bedroom. Neither one of the exposures accurately exposes the whole scene—in the shot that captures the windows correctly, the room is too dark, and when the room is exposed accurately, the draperies on the windows get blown out, losing all detail. So this is the perfect situation for an HDR image.

In many cases rightfully, HDR has a reputation as a gimmick that can easily be abused to turn your photos into dreadful, over-saturated, tacky looking messes of clown vomit. But if your main intent is to accurately capture a scene as your eye sees it, you can come away with some believable but still otherworldly images. In the end, it all comes down to personal preference.

What You'll Need:
- A camera that has auto exposure bracketing (not essential, but without it, you'll have to set the range of exposures manually and will need a tripod). At the very least you'll need manual exposure controls.
- Photoshop CS2 or higher (you can also use specialized HDR software like Photomatix, but for in this class were using using Photoshop CS4).
- Some knowledge of curves and histograms in Photoshop.

Take your shots in a exposure bracketed sequence as mentioned before, you'll get the most bang for your HDR buck with scenes that have both extremely bright and extremely dark areas of interesting detail to bring out. So choosing the right scene is an obvious first step.

1. Set your camera to auto exposure bracketing mode, which takes three (usually) sequential shots at three different exposure levels: one correctly exposed, one one-stop overexposed, and one one-stop underexposed. (If you can photography a wider range with more exposures it would be even better.)

2. Put your camera on a tripod. If you don't have one then you will want to take the three shots in the quickest succession possible since we'll be merging them later and you will want the compositions to be as identical as possible.

Note: If you can, shoot in RAW. Photoshop HDR can handle RAW files just fine, and the extra exposure information within compared to JPEG will make your HDR images all the more juicy.

Create Your HDR Image
3. In Photoshop, go to File > Automate > Merge to HDR. Select your images. Click "Attempt to Automatically Align Source Images" if you think they may be slightly crooked, and then hit OK.
In Bridge, select your images and go to Tools > Photoshop > Merge to HDR. Click OK.

Photoshop will chew on them for a while and then present you with your 32-bit HDR image.
You may notice that the file you have now doesn't look so hot. That's because a 32-bit HDR image isn't useful in itself unless you have a $50,000 HDR monitor. To look good on your screen and on paper, it must now be "tone mapped" into an 8-bit image that selectively uses parts from each exposure to accurately represent the scene.

4. Before we head to tone mapping, save your HDR as a 32-bit Portable Bit Map file so you can start fresh again if need be.

Tone Mapping Your Image
How you tone map the HDR file determines whether your result will look great or like the aforementioned clown vomit. Here, though, personal taste is everything, so if you like your images more or even less saturated and otherworldly than I do here, feel free to experiment, of course. It also helps to keep an eye on your originals as you're doing this to make sure you don't stray too far from reality.

5. With your 32-bit HDR file open, go to Image > Mode > 8 Bits/Channel. This will bring up the tone mapping window, which has four options in the drop-down: Exposure and Gamma, Highlight Compression, Equalize Histogram and Local Adaptation. The first three, to varying degrees, are automatic settings. Local Adaptation is the only one that lets you manually futz with the image curve, giving you the most creative control. Choose that one (but feel free to experiment with the others, of course).

6. Release the Black Arrow next to “Tone Curve and Histogram” Here's where things get kind of abstract. Start with the easiest adjustment, which is dragging the lower-left portion of the curve to where the histogram begins—this will make the darkest parts of your image pure black, which you want for good contrast.

7. Next choose a point higher on the curve to make your whites whiter. So grab a point up there and move it into the top portion of the graph until the whites are to your liking in the live preview.

8. And finally, choose a point in the middle and work the mid-tones. Again, preference is key, but you'll want something that, in the end, represents a classic S-curve for the best contrast. In the end, you want an image that has black blacks, white whites (but few clipping), and detail through the midrange. Your image may still look not so good when your curve is done, but that's OK.

9. The last step in the tone mapping process is to mess with the Radius and Threshold sliders. These essentially control how HDR-ed out your HDR images will look. Adjust theses to your preference. The object here is to strike the right balance between detail and a natural look.

Toning Your Image
Now you have a good old fashioned 8-bit image that contains some elements of all of your original source files, tone mapped. The final step is applying some of Photoshop's basic tools used for any photo in order to bring out the most detail possible.

10. Even though you set contrast with your tone curve, you may still be able to fine-tune it with Levels or Curves adjustment layers. You may also choose to adjust Hue/Saturation.