High Dynamic Range Imaging & Glare Analysis

II. HDR PHOTOGRAPHY USING PHOTOSPHERE

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HDR Imaging and Glare Analysis

This document is one out of a series of three tutorials that introduce the reader to high dynamic range (HDR) imaging, photography and how to analyze an HDR photo or simulation for potential glare.

The tutorials can be downloaded from the G(SD)^2 website.

First tutorial that introduces some basic terminology related to high dynamic range imaging.

Second tutorial that shows how to generate a calibrated HDR image using a digital camera, the Photosphere program written by Greg Ward and a luminance meter.
Note: A MAC is needed for this tutorial!

Third tutorial that shows how to analyze an HDR image (photo or simulation) using the 'evalglare' program written by Jan Wienold as well as the Radiance Image Viewer from Autodesk Ecotect

In This Tutorial

* *Note: You will need a MAC to follow this tutorial.*
- Download Photosphere Software
- Set Up Camera
- Select a Scene
- Capture Luminance Reading
- Take Photo Series
- Make an HDRI Photo
- Calibrate Camera
- Save the image for Glare Analysis
- More available tools.

Photosphere

Download and install a copy of Photosphere a software designed to easily create HDRI images from multiple images. *Note: This is a Mac program.*

www.anyhere.com

Link named:

→ Download a copy of Photosphere

Setting Up

What you need:

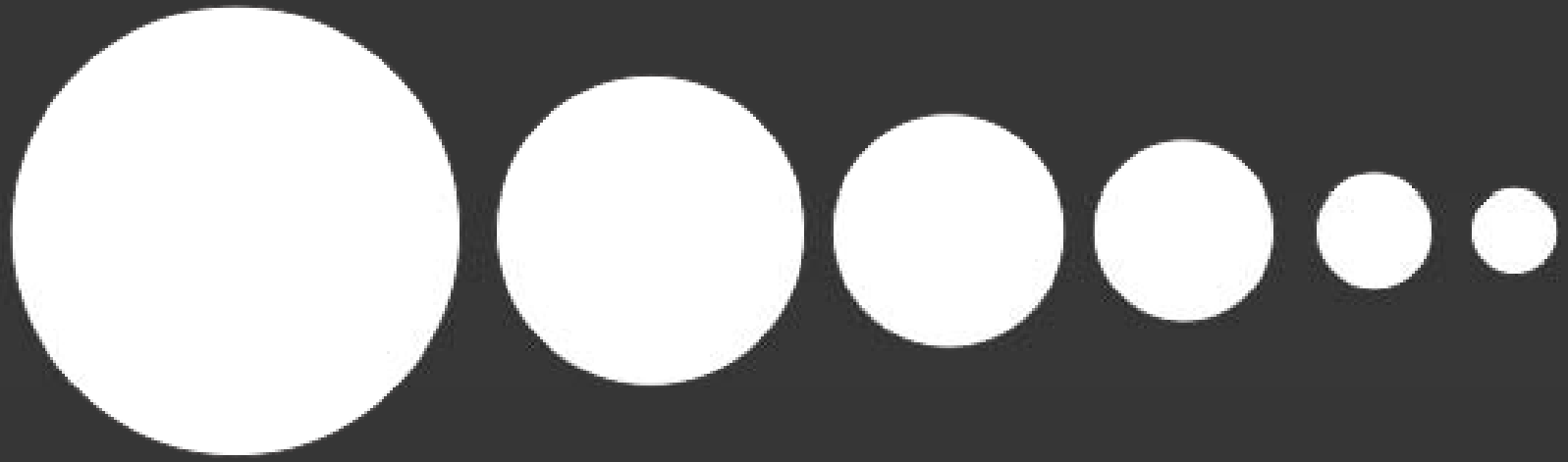
Digital Camera w/Manual Settings
- Aperture
- Shutter Speed
- Exposure Value

Mac Computer

Luminance Meter (+ Tripod)

Aperture

Controls the amount of light reaching the image sensor. In combination with variation of shutter speed, the aperture size will regulate the image sensor's degree of exposure to light.



The smaller F Stop number the larger the opening and the greater the amount of light entering the camera.

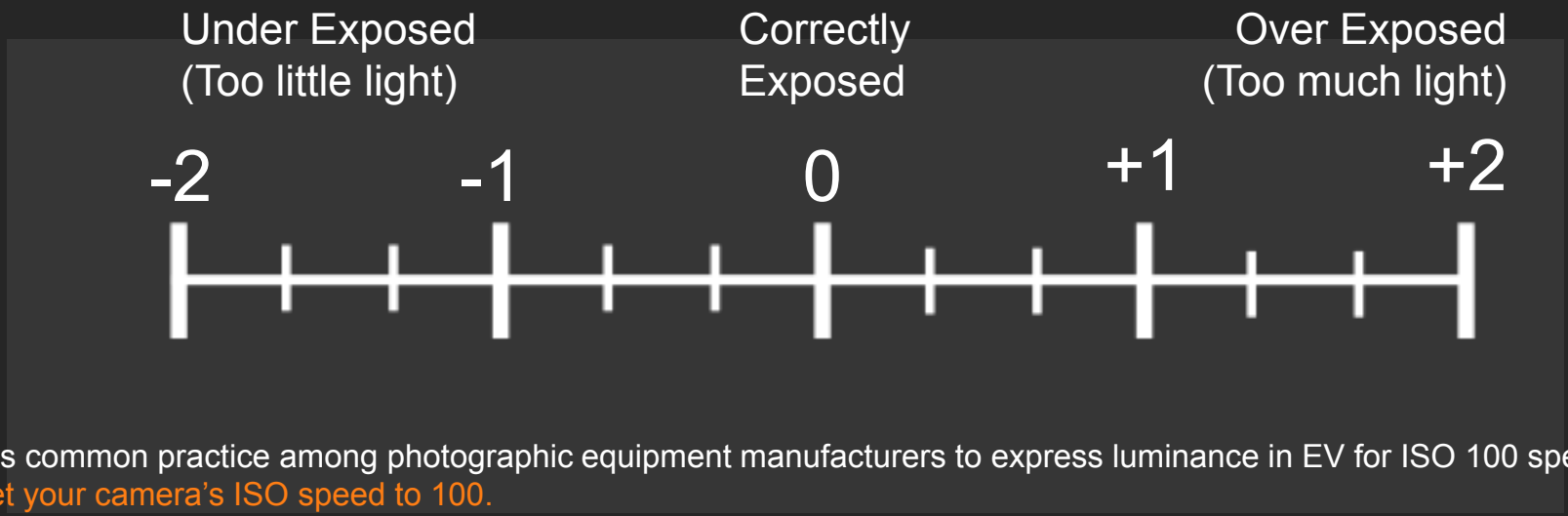
Shutter Speed

The effective length of time a shutter is open or duration of light reaching the image sensor. The longer the shutter is open the more light reaches the image sensor.

Faster
1/1000 s
1/500 s
1/250 s
1/125 s
1/60 s
1/30 s
1/15 s
1/8 s
1/4 s
1/2 s
1 s
Slower

Exposure Value

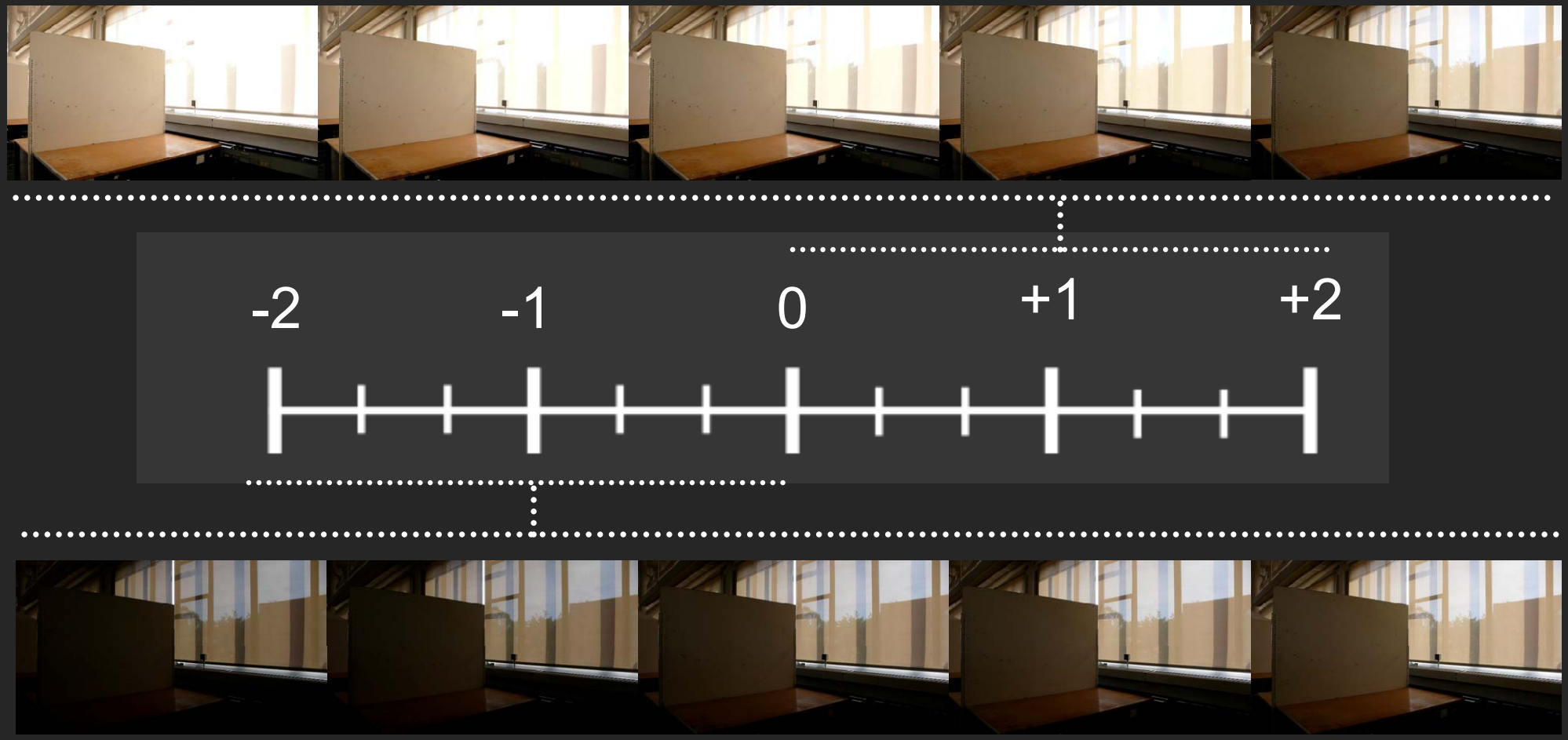
1. How much light will be admitted to the film by the combination of lens aperture and shutter speed.
2. How much exposure is required by the combination of subject luminance (e.g., how bright it is) and film speed.



It is common practice among photographic equipment manufacturers to express luminance in EV for ISO 100 speed.
Set your camera's ISO speed to 100.

Set Aperture

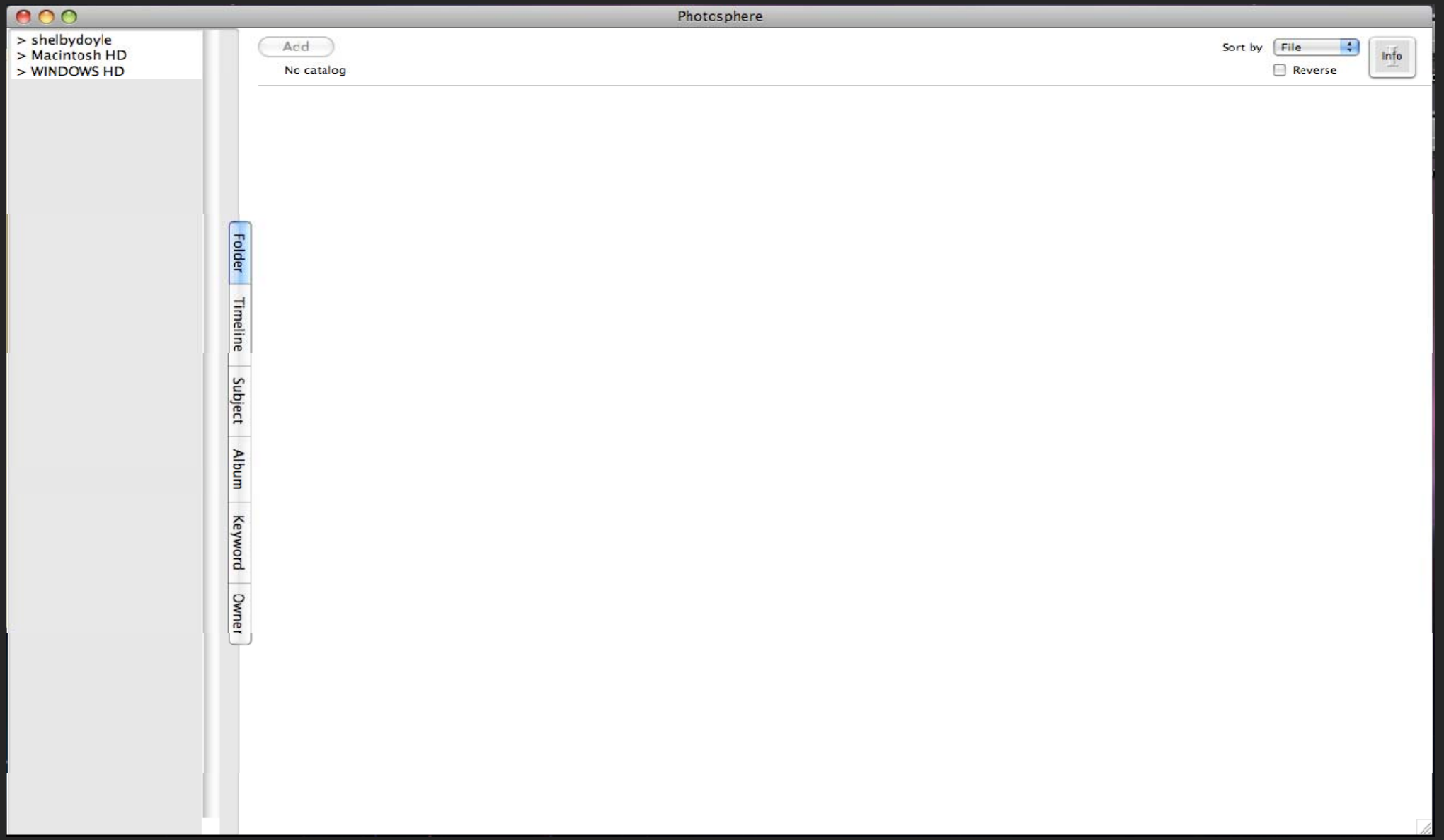
Take a photo at each EV to capture a full range of light.



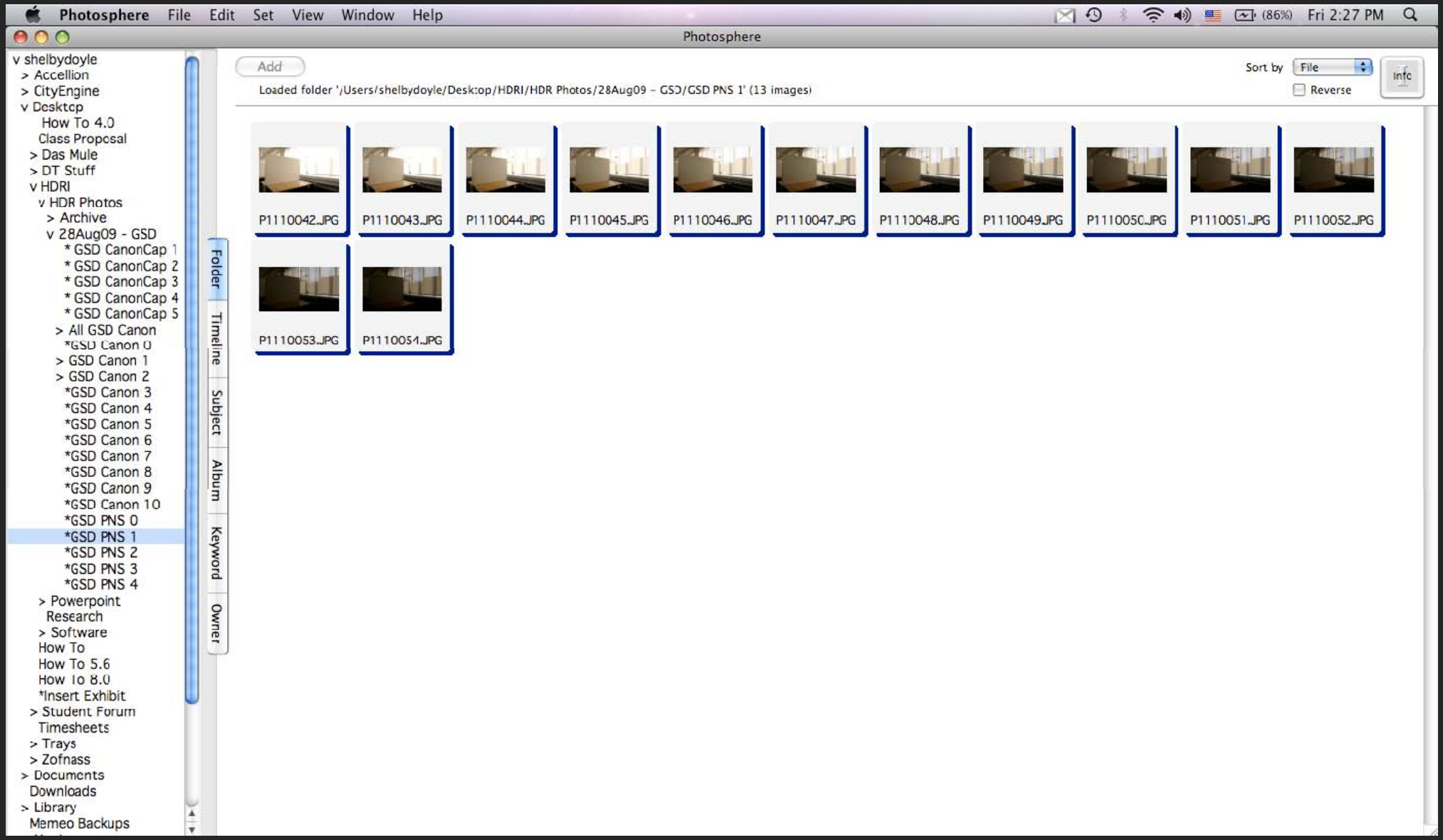
Upload Photos

Save the photos in an easy to locate folder

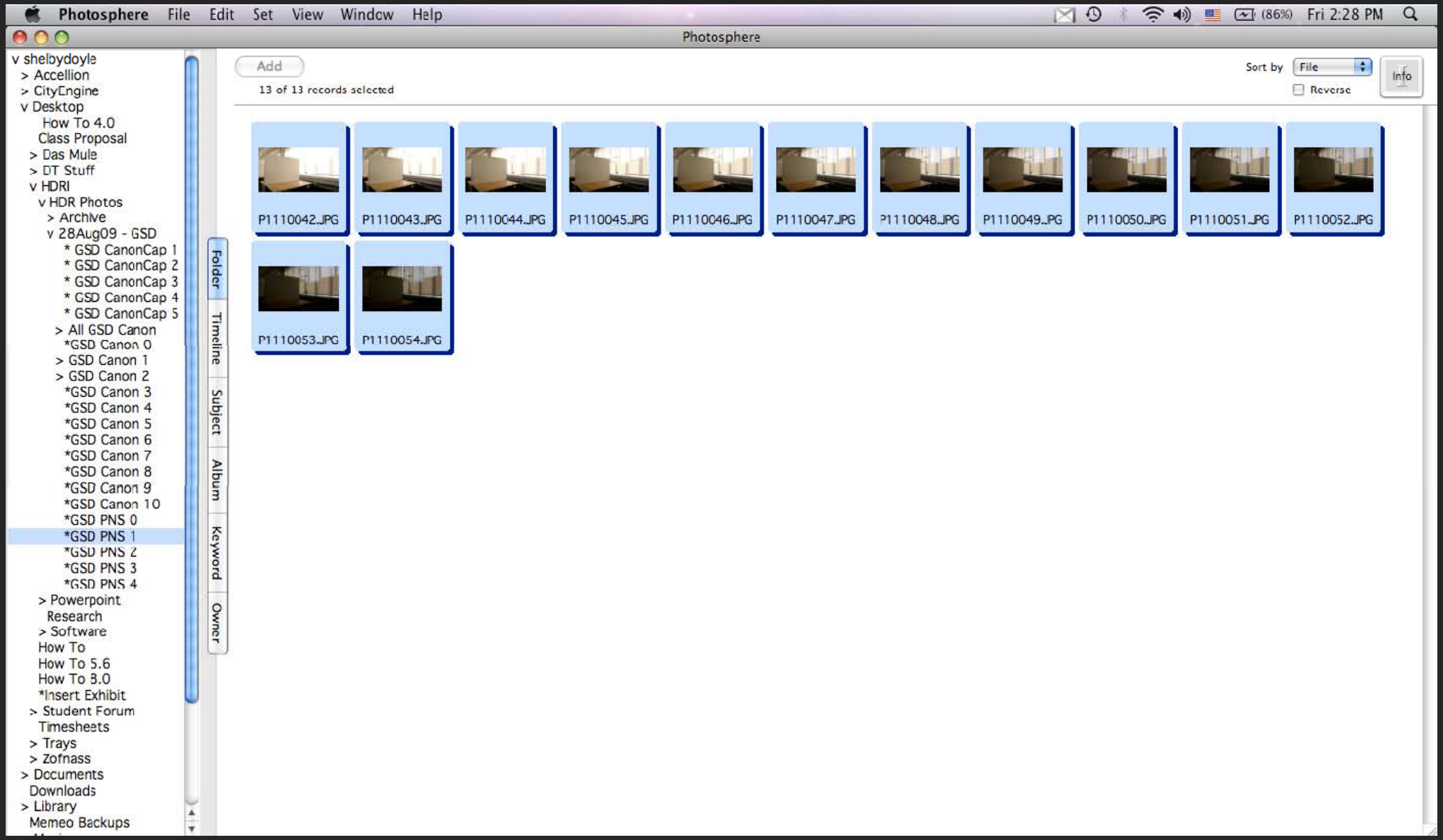
Open Photosphere.



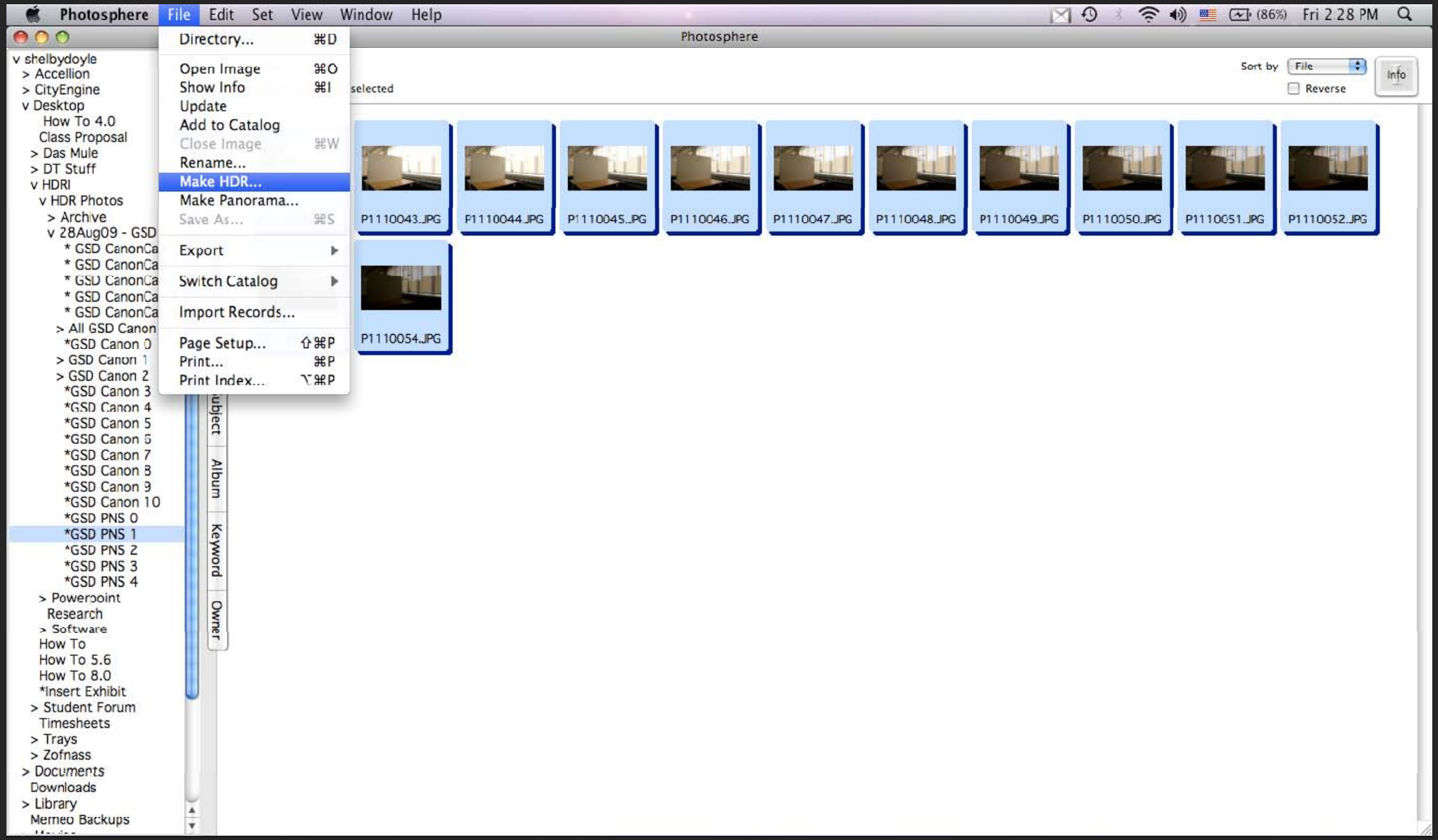
Double click the folder name to load the photos.



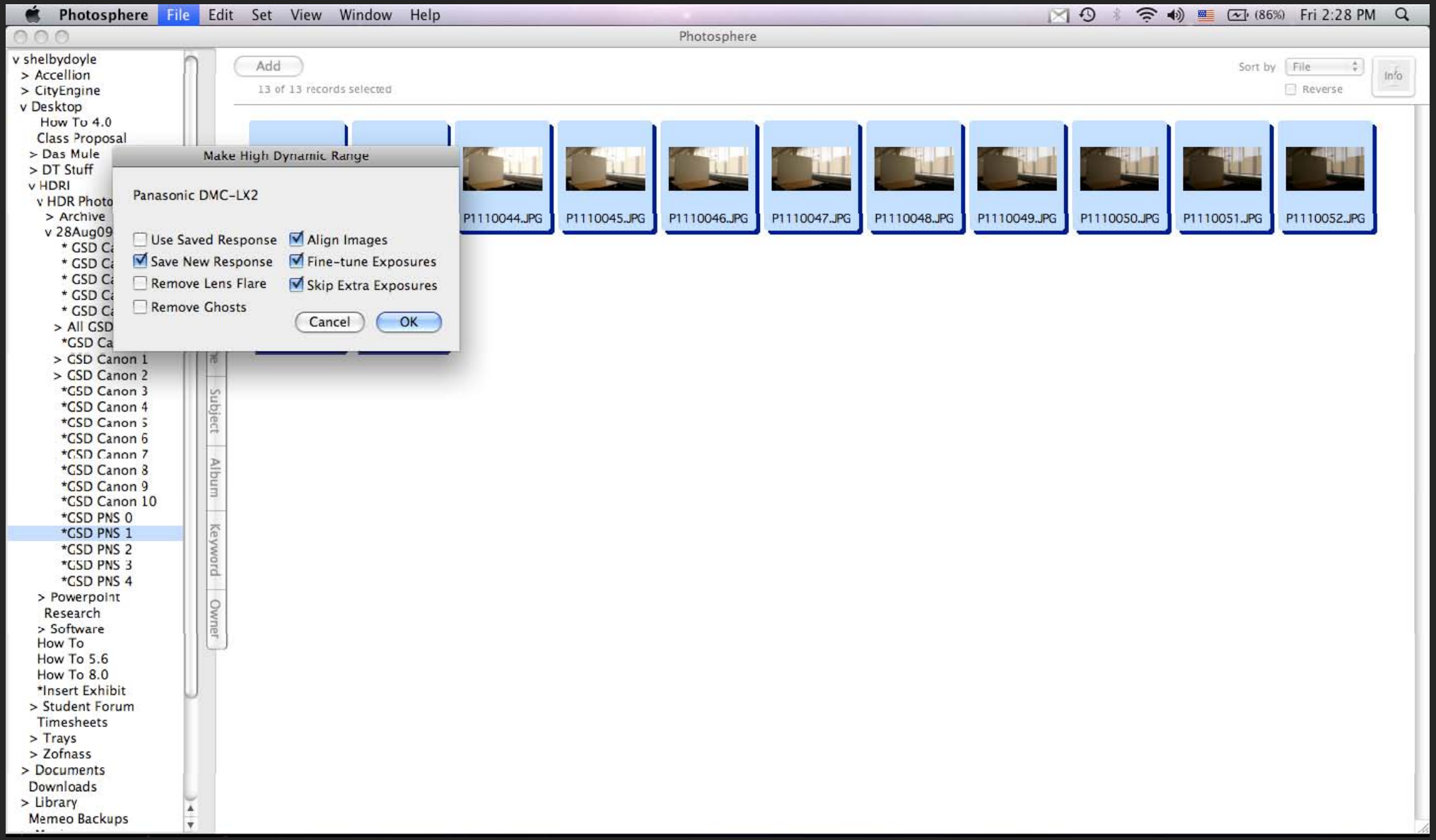
Select the photos needed to make an HDR photo.



Select File then Make HDR



Select the below HDR settings.



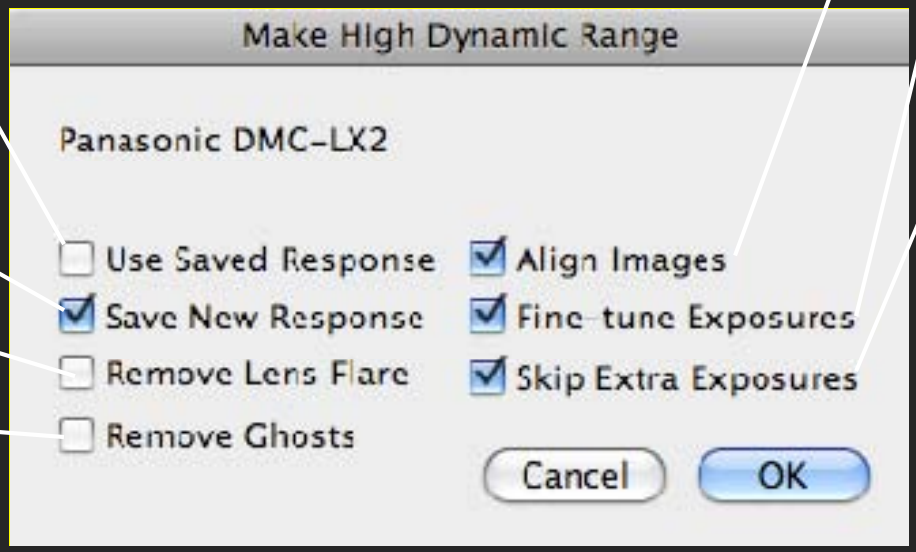
Photosphere HDR settings explained.

Once a calibration response is saved for the camera it can be used instead of recalibrating eacn time

Save a calibration response for the identified camera, in this case a Panasonic DMC-LX2

Removes light artifacts from the scene, such as from the sun.

Removes people from a scene

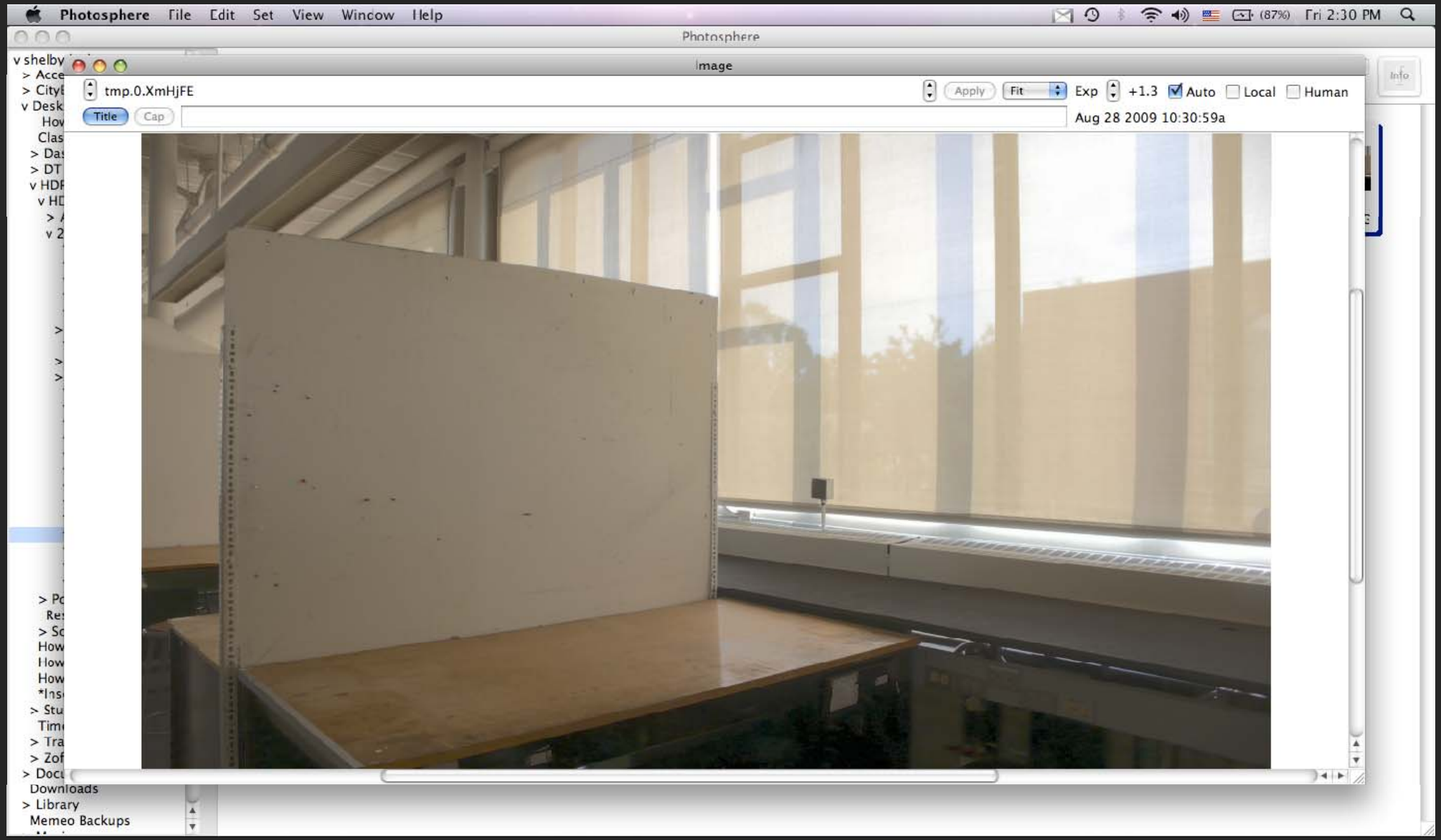


Automatically aligns images if tripod shake occurred

Automatically fine-tune exposures for exposure values

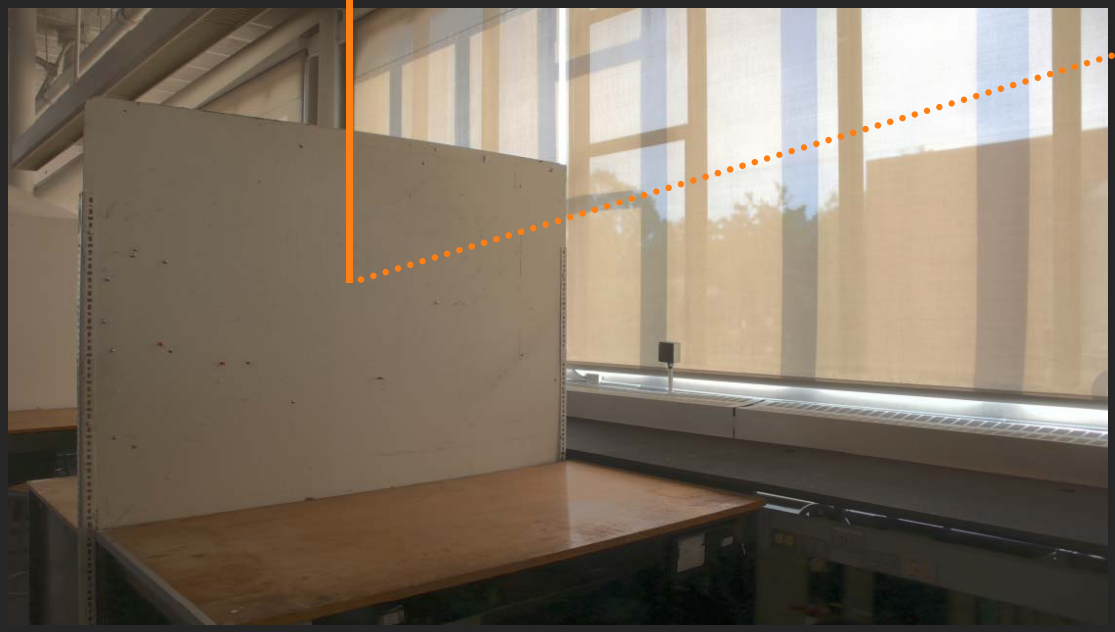
Automatically skips unnecessary exposures

The HDR photo will appear.

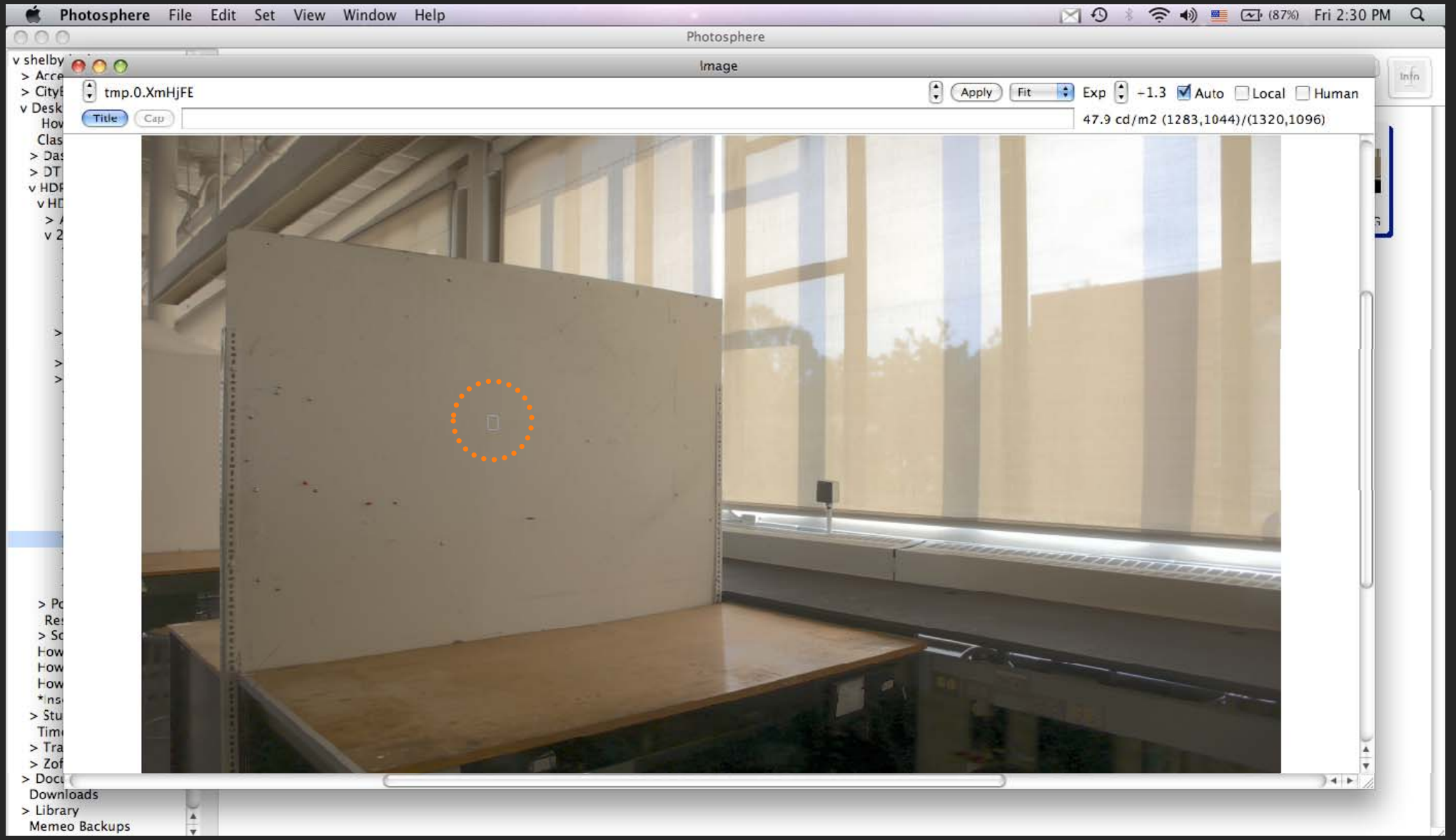


Pick a spot in the actual space to calibrate with the Luminance Meter.

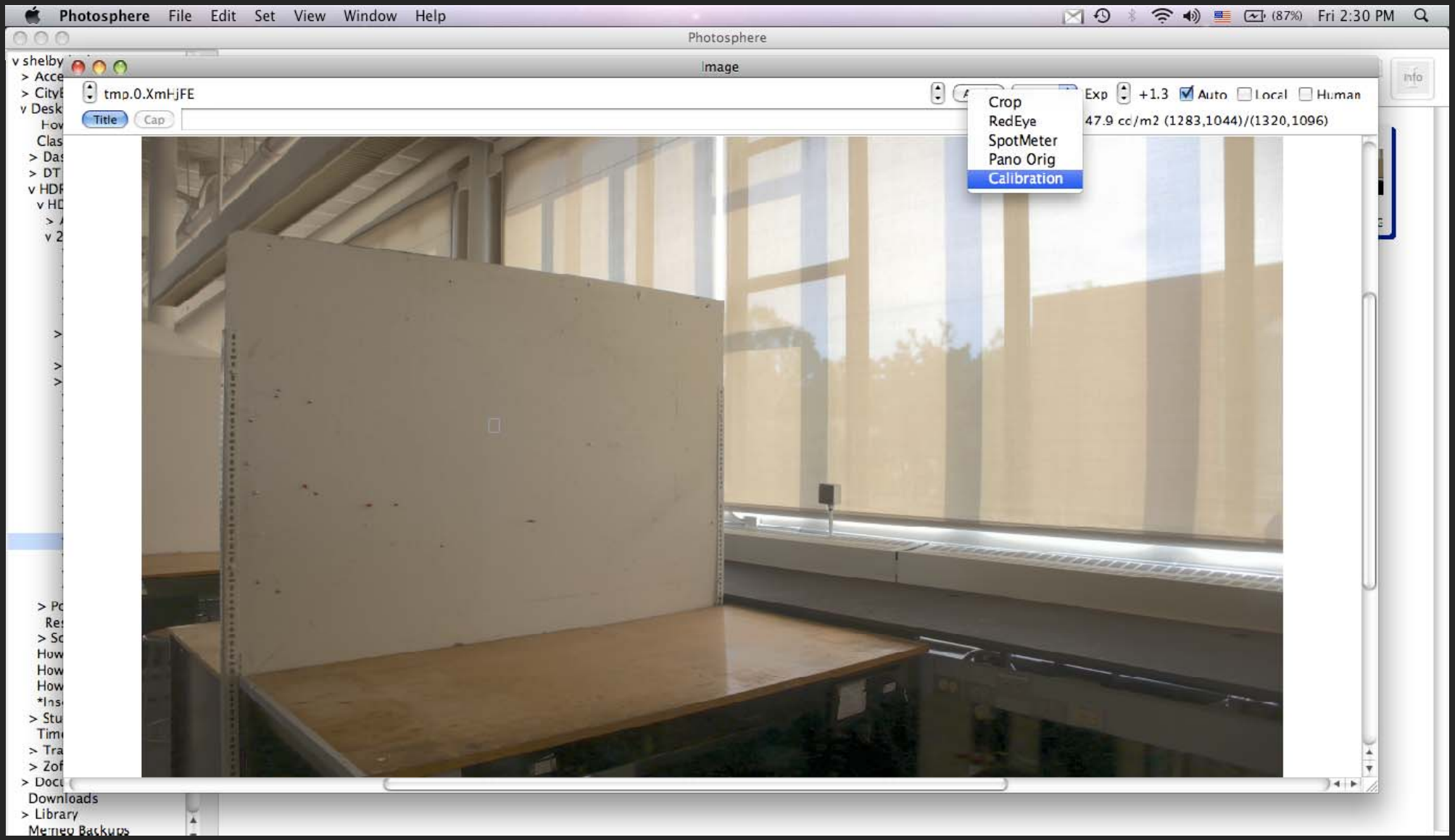
Record the cd/m2



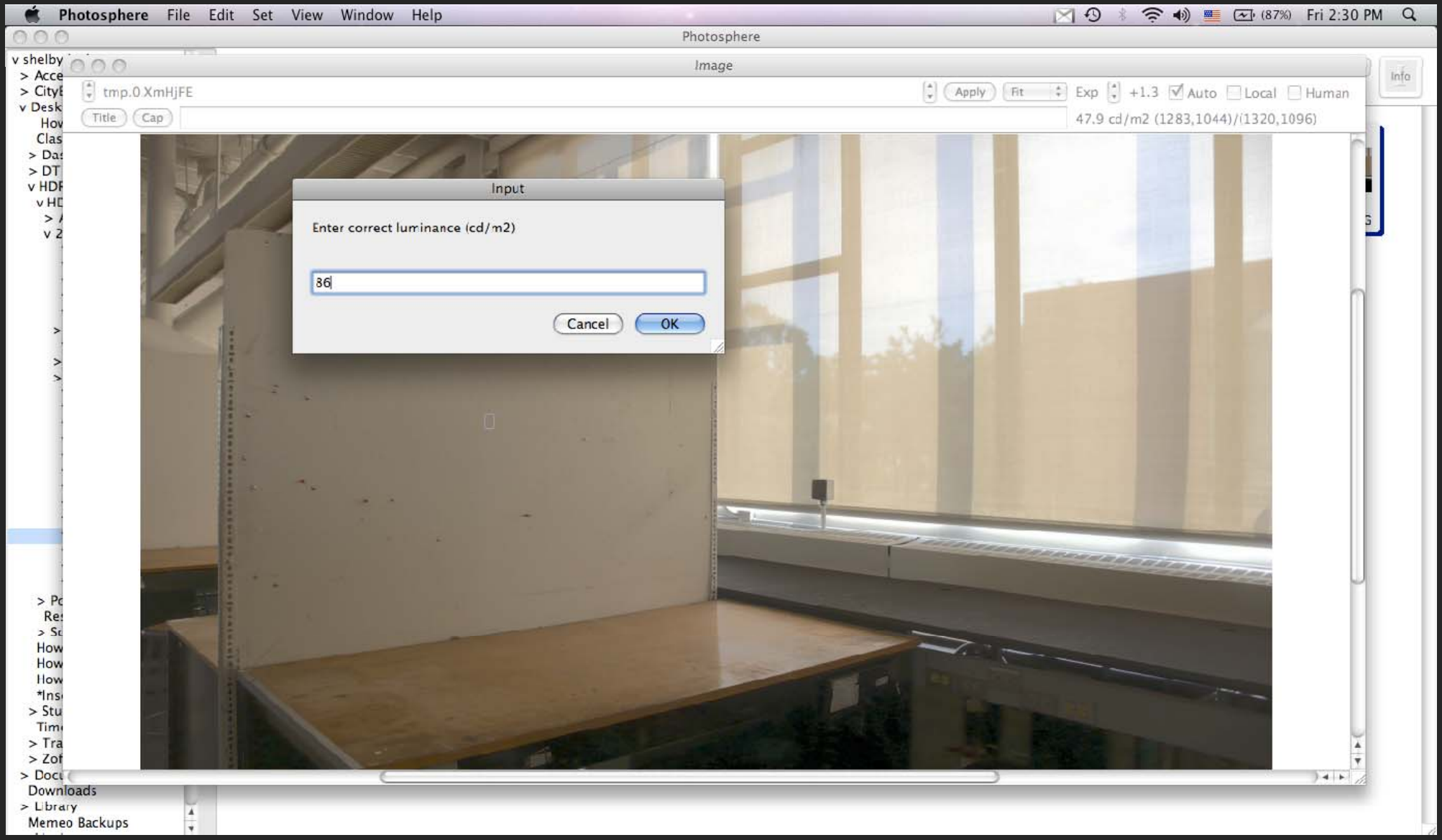
Pick the same spot in the photo.



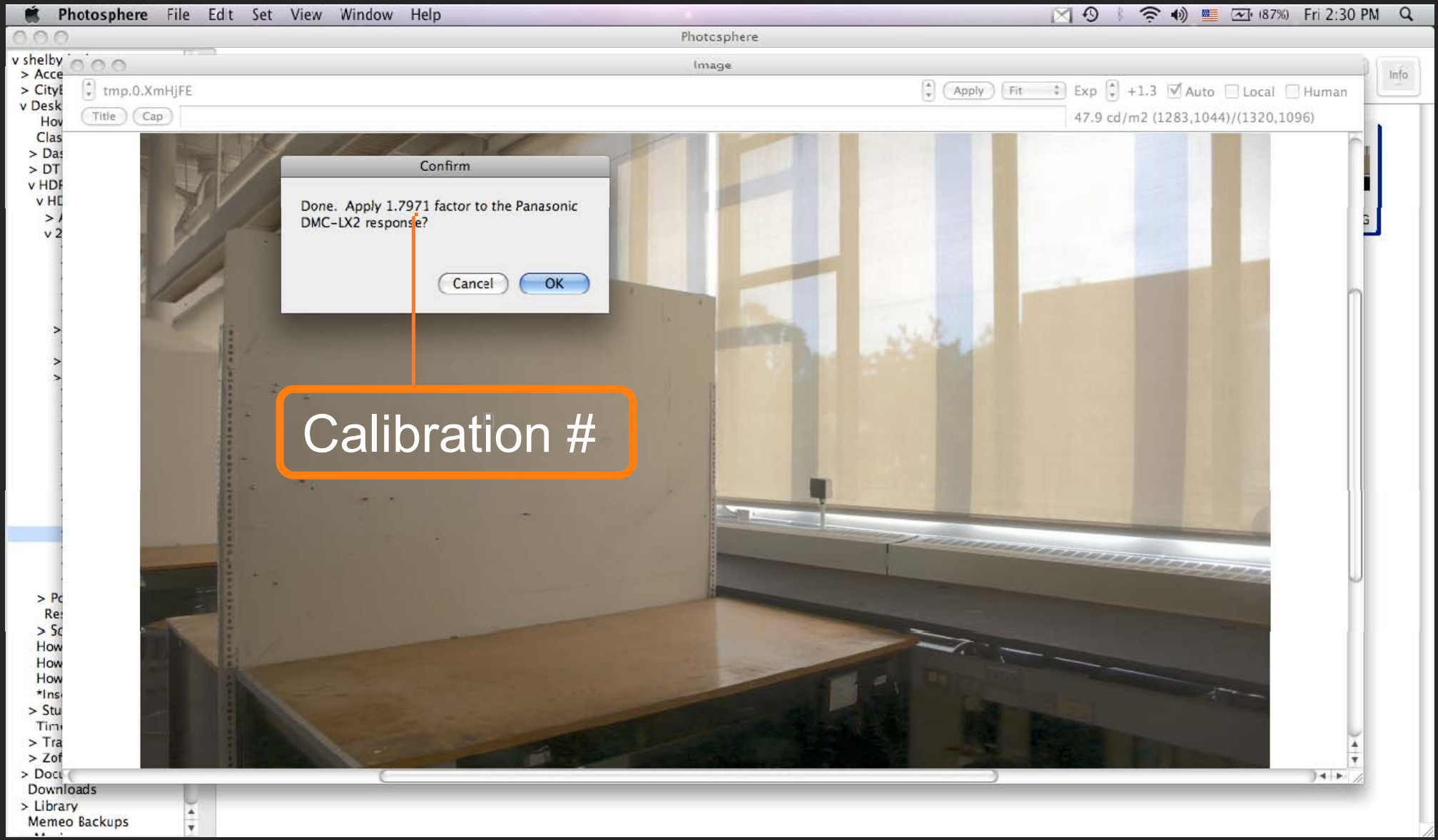
Select Calibration from the Apply Menu.



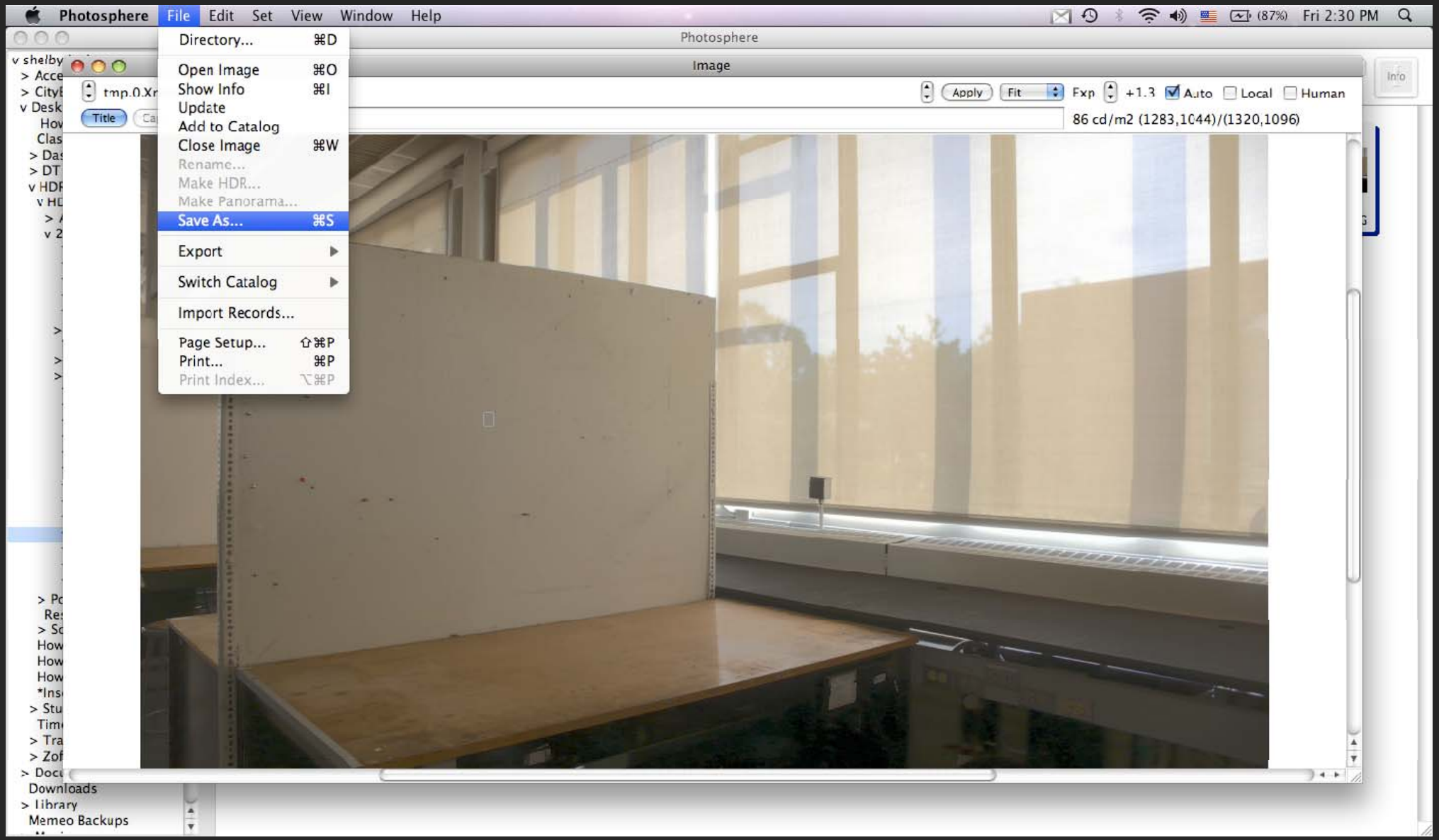
Enter the cd/m2 value from the Luminance Meter.



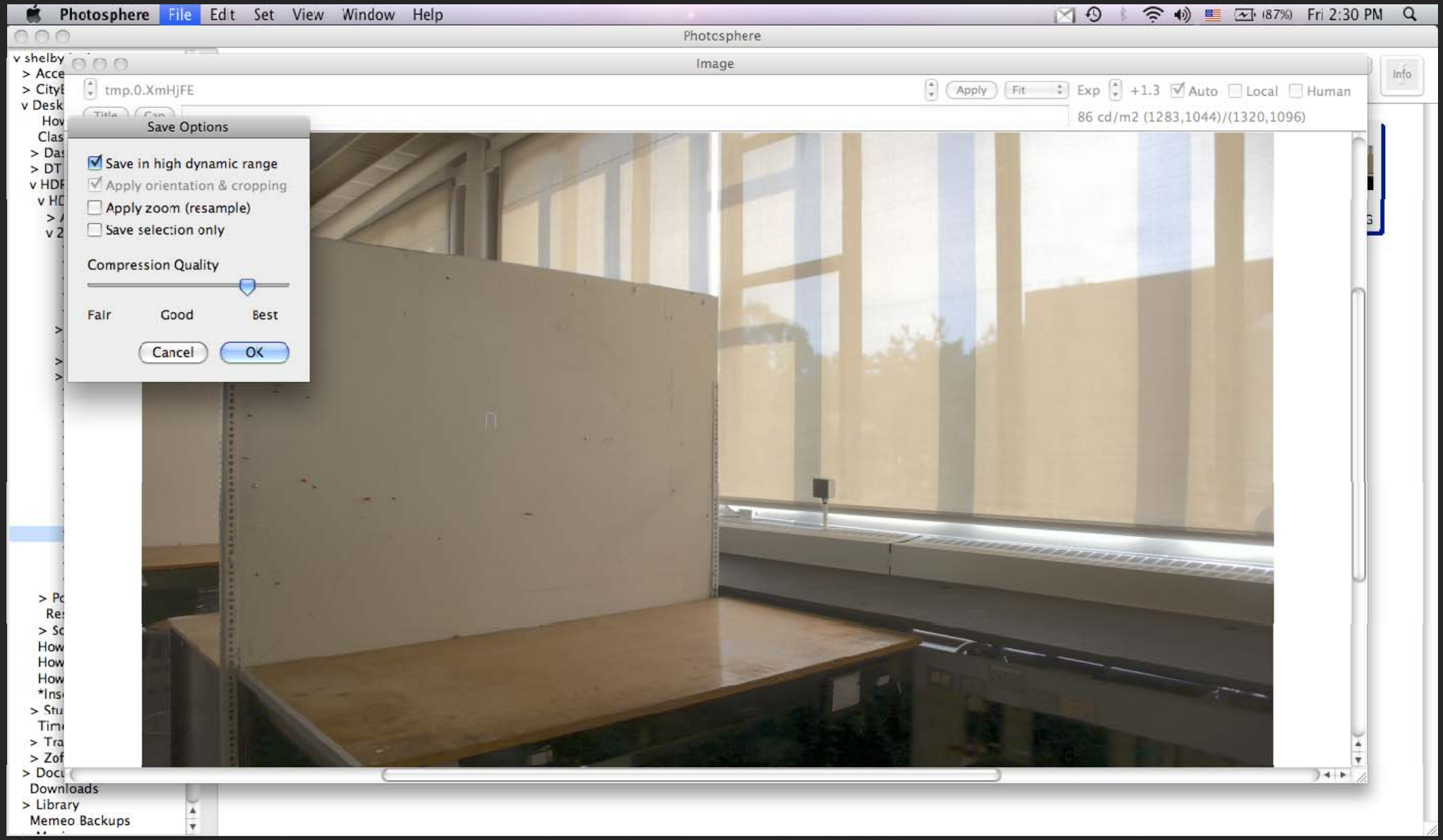
Record the calibration factor for your camera. Press OK.



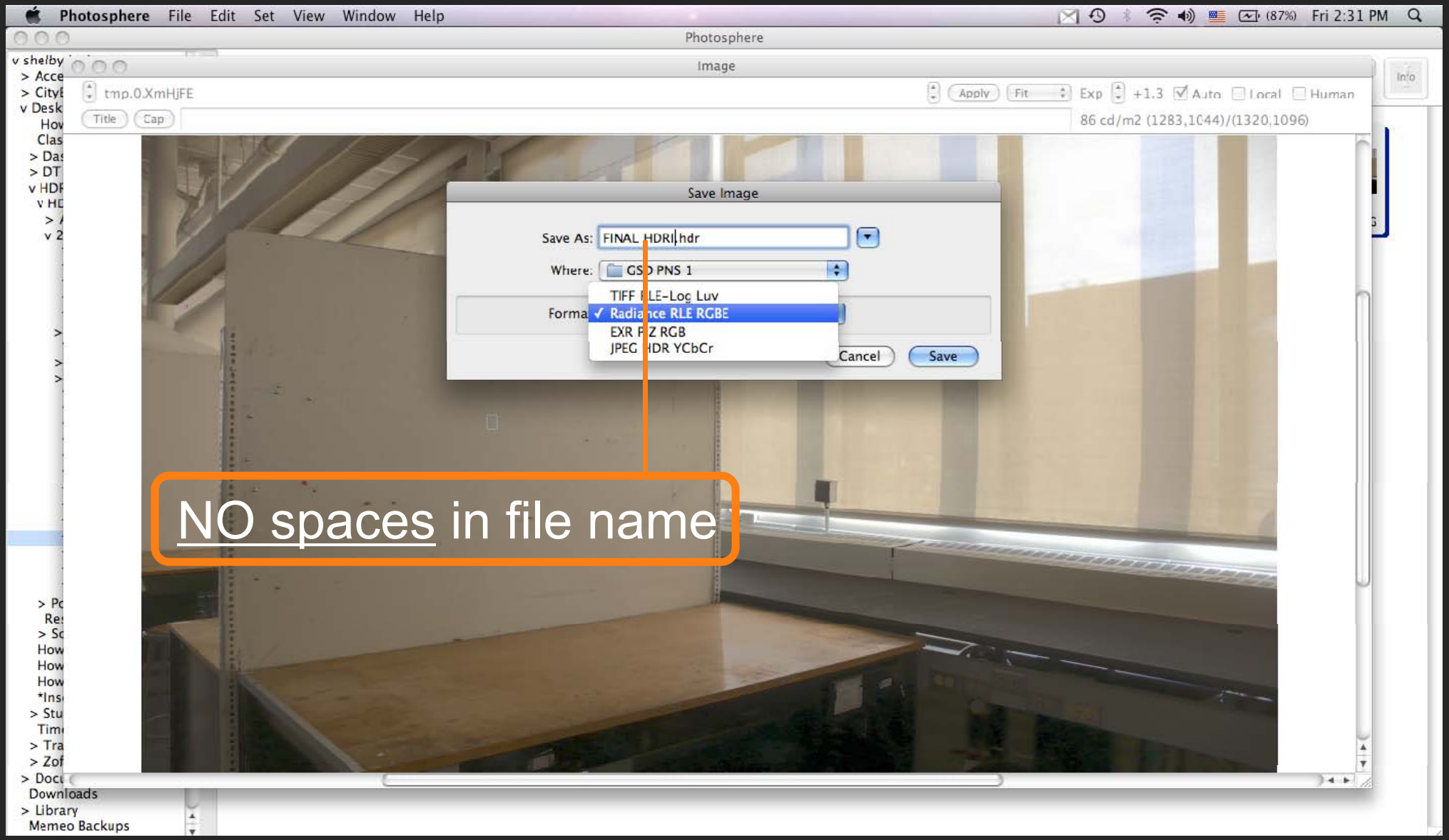
Save the HDR Image.



Save the HDR Image in High Dynamic Range.



Save the HDR Image as an .hdr file extension.



Note that an .hdr file extension is the SAME file format as a Radiance .pic file extension which is created during a simulation. Both file types can be used to do an Evalglare glare analysis.

.hdr = .pic

To run Evalglare an image of less than 800x800 pixels is needed. If possible adjust the size of the image now. Otherwise this can be done in Evalglare.

Switch to a PC to begin HDRI Glare Analysis.

High Dynamic Range Imaging

III. GLARE ANALYSIS: EVALGLARE

http://www.gsd.harvard.edu/research/gsdsquare/tutorials.html

For HDRI Background Information.

High Dynamic Range Imaging

I. DEFINITIONS

http://www.gsd.harvard.edu/research/gsdsquare/tutorials.html

4.430 Daylighting

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