High Dynamic Range and Aurora HDR 2017

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What is Dynamic Range

- Dynamic Range is the difference, usually measured in stops, between the darkest blacks and brightest whites in a scene.
- Typical modern digital cameras have a dynamic range of up to 12-14 stops, but many have less dynamic range.
- The human eye, because it can adapt instantaneously to changes in light level, allows us to see detail in the darkest areas as well as the brightest areas of a scene by adapting to each area. The eye can see over a range of nearly 24 stops.
- The camera cannot record the full dynamic range of very high contrast scenes.
- Additionally, prints and screen displays have a much lower dynamic range than the eye or the camera, and tone mapping is required to compress the dynamic range of a scene into a smaller value suitable for print or viewing.

What is HDR?

- High Dynamic Range (HDR) photography is a technique designed to overcome the limitations of image sensors in digital photographs by using multiple exposures of the same subject taken at different exposure values (brackets)/
- HDR software is then used to merge the brackets into a single shot which contains a greater exposure range.
- Following the merging, tone mapping is normally also applied to the image.
- Other HDR techniques include image blending and luminosity masking, complex techniques normally performed in Photoshop.

What is Tone Mapping?

- Tone mapping is a technique used in image processing and computer graphics to map one set of colors to another to approximate the appearance of high-dynamic-range images in a medium that has a more limited dynamic range.
- Print-outs, CRT or LCD monitors, and projectors all have a limited dynamic range that is inadequate to reproduce the full range of light intensities present in natural scenes.
- Tone mapping addresses the problem of strong contrast reduction from the scene radiance to the displayable range while preserving the image details and color appearance important to appreciate the original scene content.

(From Wikipedia)

Do I need to do HDR?

- Maybe, it depends on the scene and your camera.
- If the scene has a dynamic range less than or equal to the dynamic range of your camera, brackets are not necessarily required.
  - *But, you still need to process correctly to produce an image that includes the full dynamic range.*
    - First, shoot in raw.
    - Second, boost the shadows and reduce the highlights.
    - Third, use an HDR program to tone map the single image.
  - *Additionally, boosting the shadows can significantly increase the noise in the shadows, depending on your sensor characteristics. So you may want to bracket even if the scene dynamic range is within the dynamic range of your sensor.*
- If the scene has a dynamic range greater than the dynamic range of the camera, bracketing is required to capture the full dynamic range.
  - *The number of brackets depends on the dynamic range of the interest.*
  - *Need to capture the darkest areas of the scene without clipping the blacks and the brightest areas of the scene without clipping the whites.*
  - *Most modern camera automate the bracketing process.*
- Another option for reducing dynamic range in some scenes is the use of a graduated filter.

Popular HDR Software

- Lightroom
- Photoshop
- NIK HDR Efex Pro 2
- Photomatix Pro
- Aurora HDR 2017

- Also, some digital cameras have an HDR mode that combines multiple exposures in camera, but this mode produces jpeg files, not raw files, limiting further processing.

Aurora HDR 2017

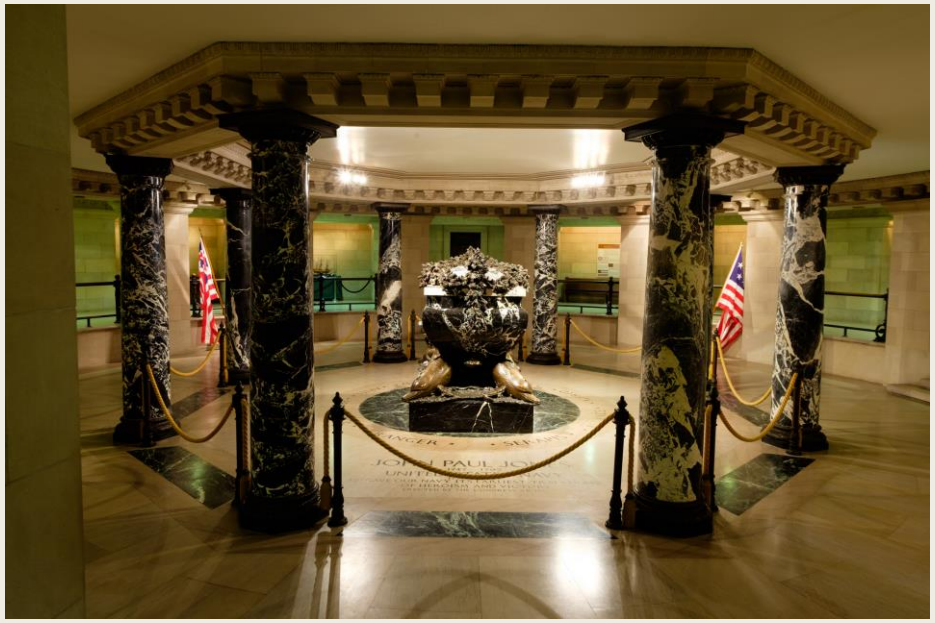
- Created by MacPhun and Trey Radcliff
- Currently only for Macintosh, but Windows version coming in 2017
- Many of the MacPhun team came from NIK after Google acquired NIK
- MacPhun also produces Creative Kit (NIK++) and Luminar
- Current Aurora price is $89

Key Aurora HDR 2017 Features

- Improved HDR algorithms
- Complete set of tools for HDR editing
- Presets
- Layers, brushes, masks, and opacity
- Luminosity masks
- Denoise
- Radiance and glow controls
- Overlays, including textures
- Detail enhancement
- Batch processing
- Stand-alone or as a plug-in to Lightroom, Photoshop, Aperture, Elements

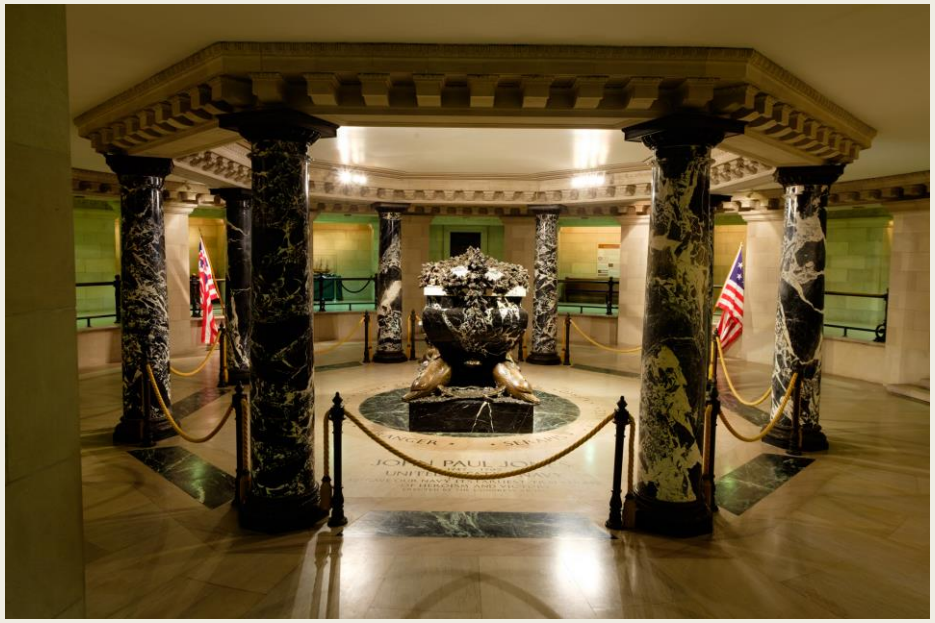
Example - single image processed in Lightroom and Aurora

Normal exposure

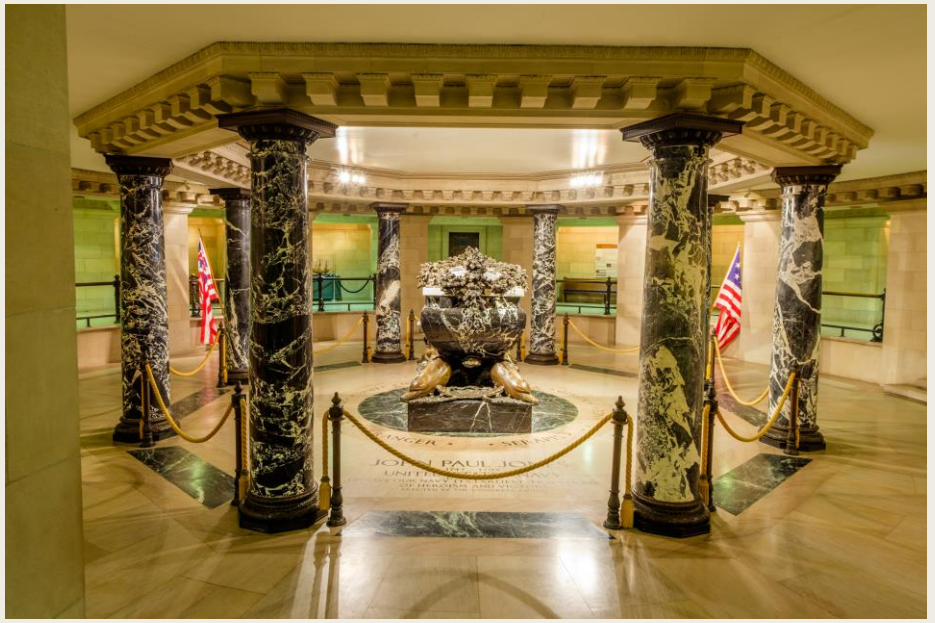


Example - single image processed in Lightroom and Aurora

Normal exposure

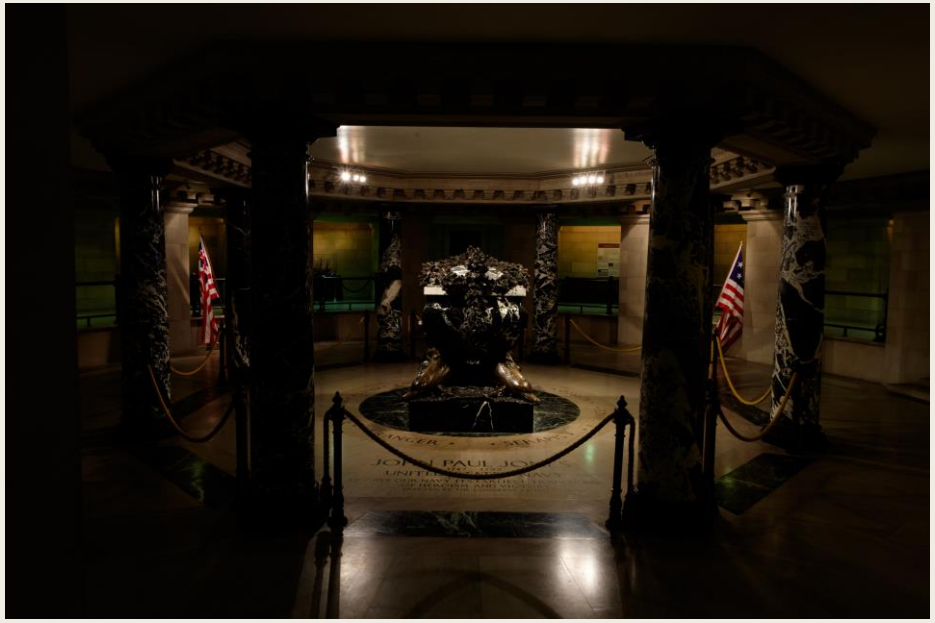


Normal exposure, highlights and shadows adjusted

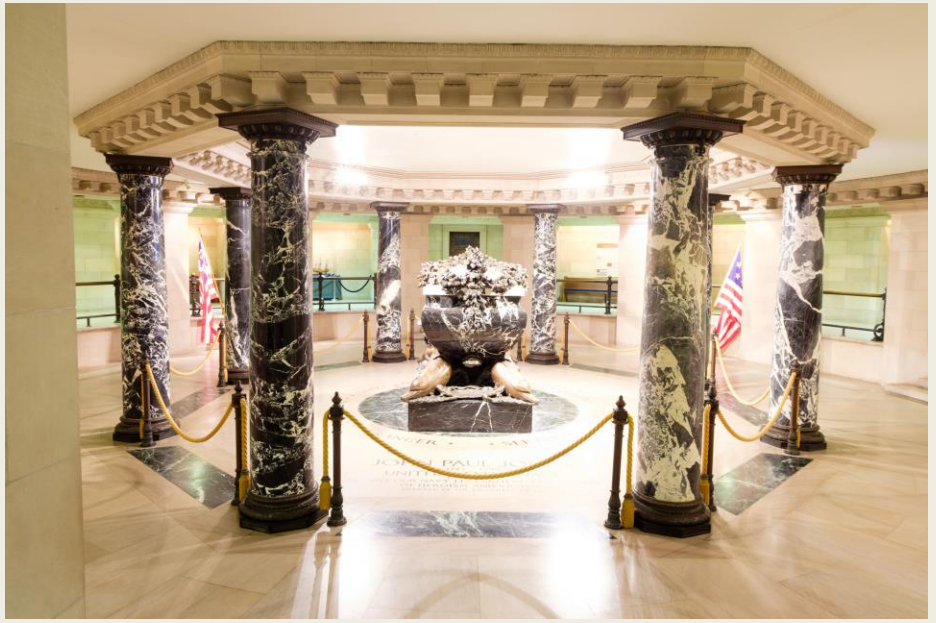


Example - two additional exposures used to create the HDR image

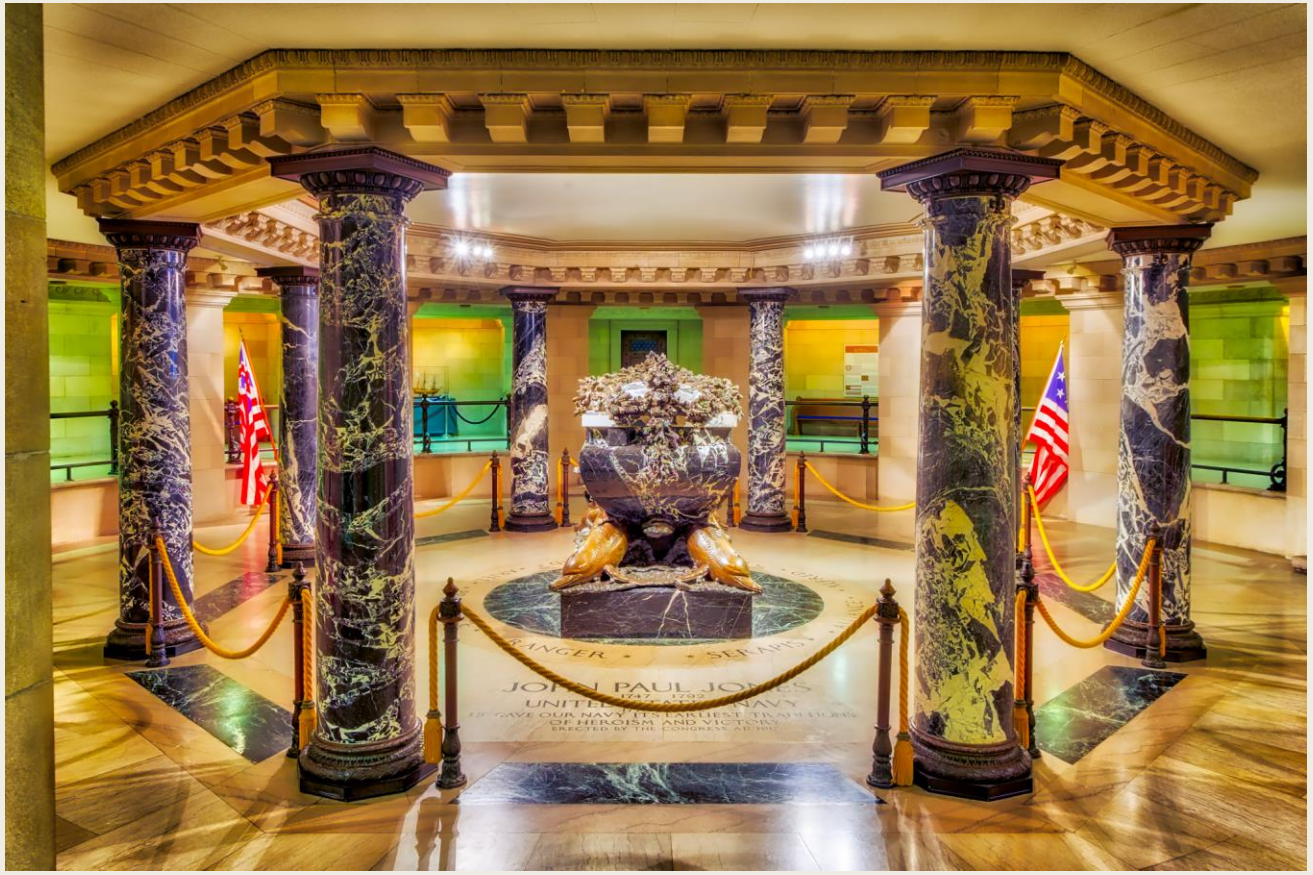
-2 stops image



+2 stops image

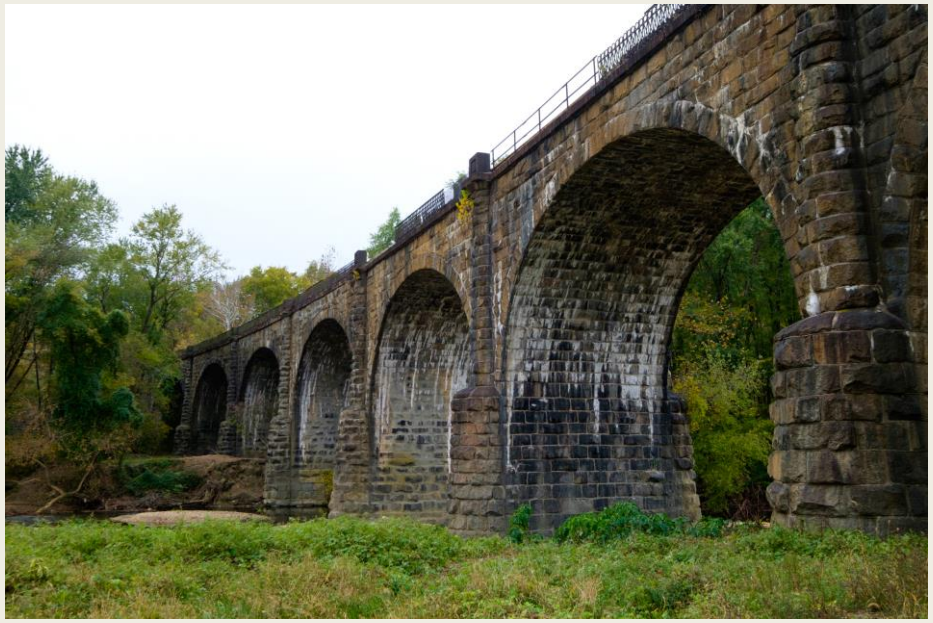


Aurora HDR 2017 image from 3 exposures



Example single image processed in Aurora HDR 2017

Original image



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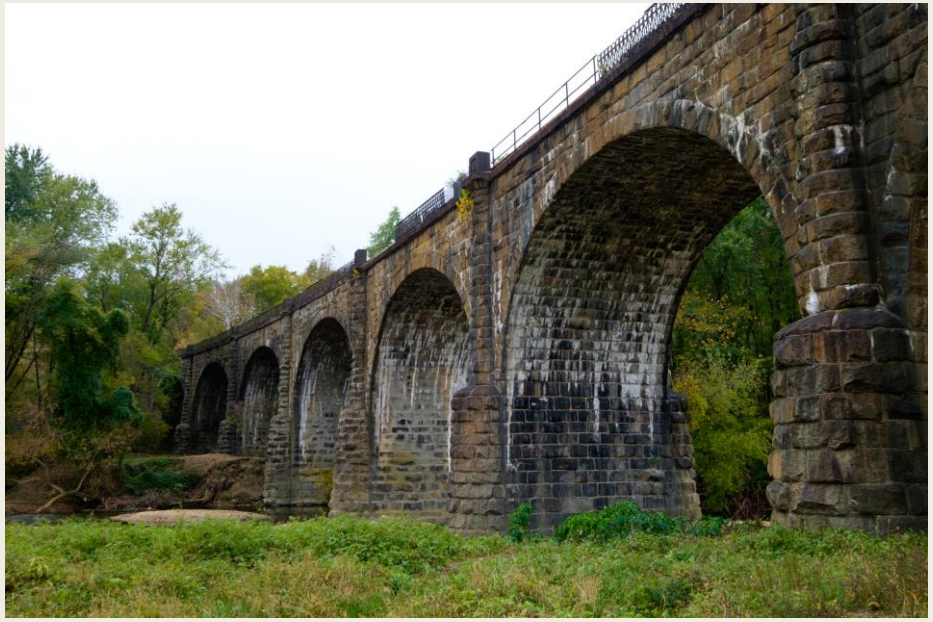
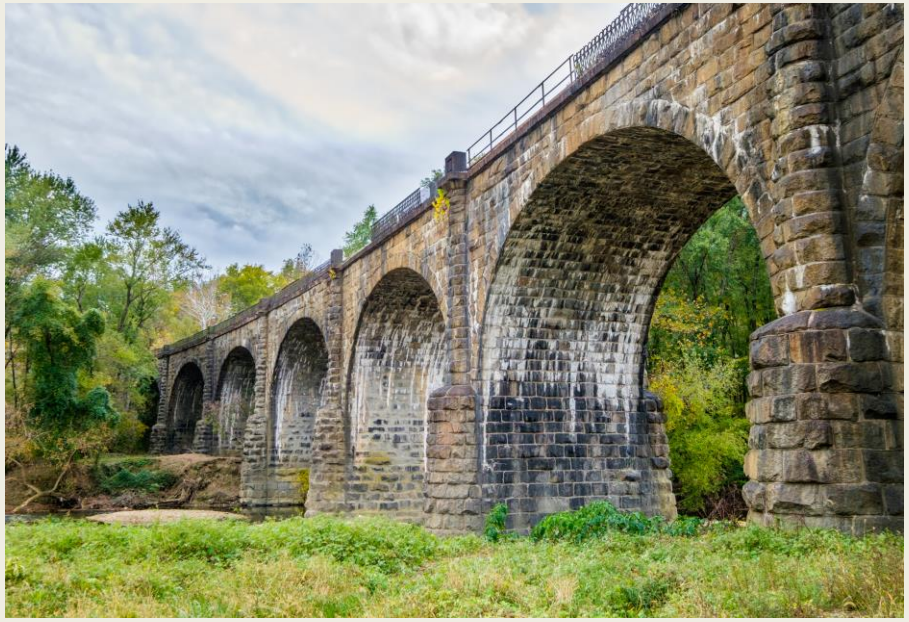


Aurora HDR 2017 image



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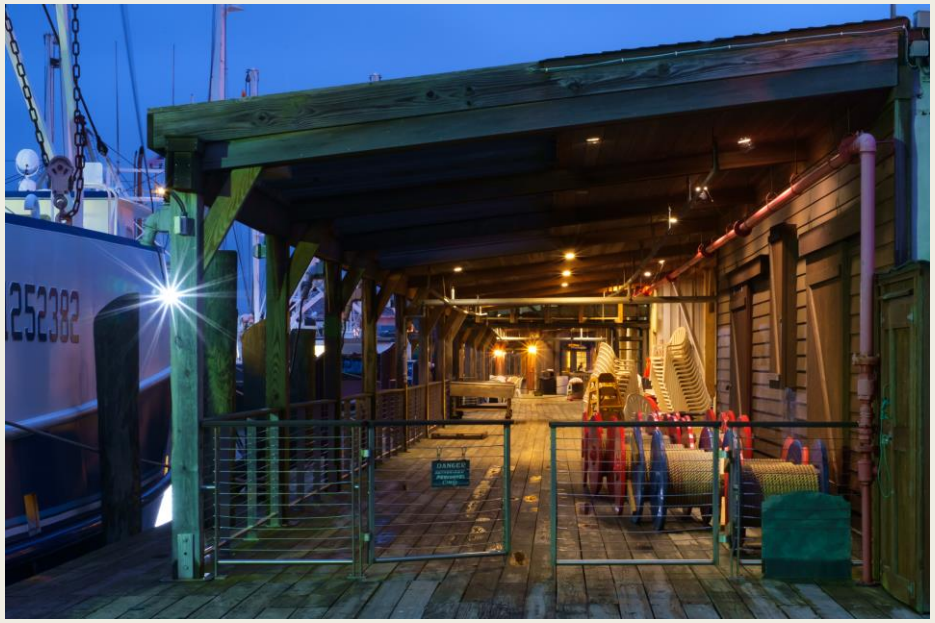

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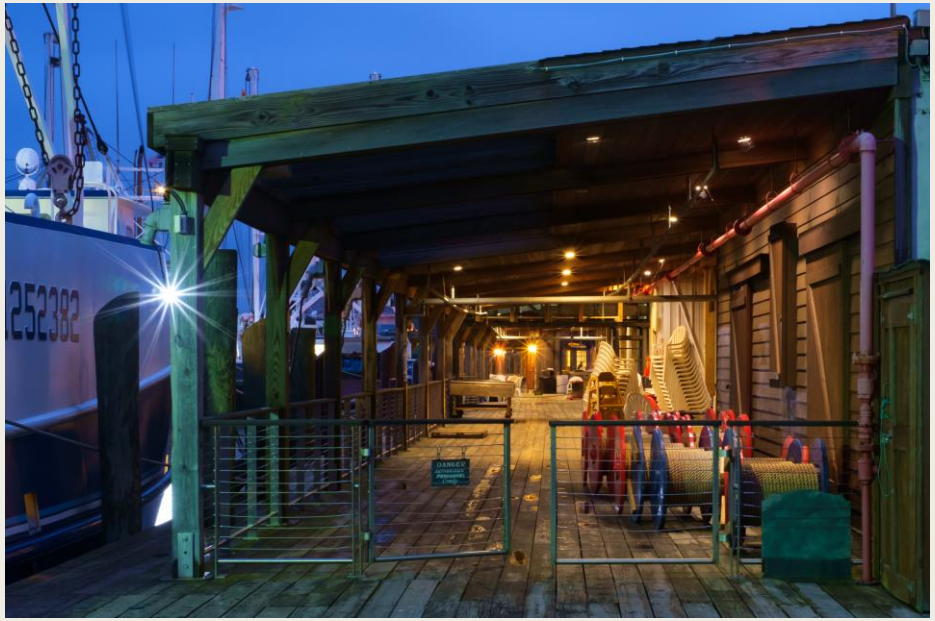
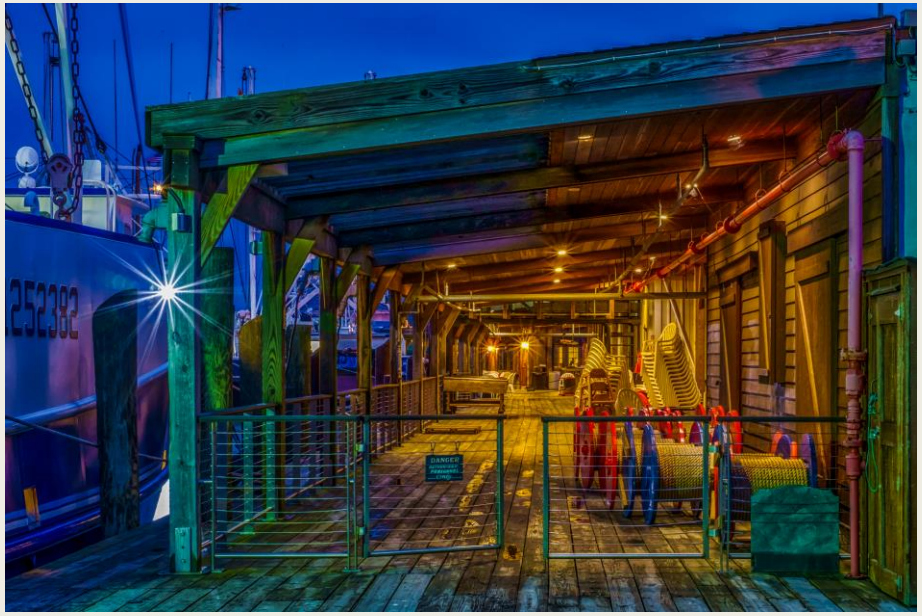


Aurora HDR 2017 image



Demo of Aurora HDR 2017

- Menus and Controls
- Bracketed Image Processing
- Single Image Processing
- Presets
- Layers and Masks
- Luminosity Masks
- Denoise