TIMELAPSE PHOTOGRAPHY:
AN INTRODUCTION

Brian Hawkins
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Why use timelapse?

- Reveal beauty in motion otherwise too slow to enjoy
- Longer exposure time allows for filming very dim scenes such as night landscapes and stars
- Research movement patterns
How is a timelapse made?

• Video is simply a series of still images displayed in rapid succession (typically, 24 or 30 frames per second)

• Timelapse is usually produced by shooting numerous (>100) photos over a period of time and assembling them into a video clip using software
Advantages of still photos vs simply speeding up regular video

- A smoother look to the timelapse due to motion blur from long exposures
- Raw format images allow for better dynamic range, color gamut, and lossless editing options
- Greater resolution from still images allows for video clips larger that High Definition plus extra room to crop or pan in post
- The ability to use individual frames as high quality still images
**Timelapse Equipment**

**Essential Hardware**
- Camera
- Tripod
- Intervalometer

**Advanced Hardware**
- More cameras!
- Neutral density filters
- Motion control devices (& more tripods for them)
- Fast memory cards
- Sherpas to carry the above

**Essential Software**
- LRTimelapse (free version)
- Quicktime Pro 7
- Lightroom
- Panolapse

**Advanced Software**
- LRTimelapse (Pro version)
- After Effects
- Plugins (Neat Video, GB Deflicker, Re:Vision)
Shooting timelapse

• Turn off autofocus

• Use manual exposure program so exposure does not change

• Do not use auto white balance if shooting JPG

• Consider using reduced resolution such as small raw or small JPG (remember, you only need 2 megapixels for full HD video).

• Capturing 300 frames will result in a 10 second video clip
Choosing intervals

The wrong interval (time between shots) can defeat the intended purpose of timelapse - revealing motion

- Too short an interval results in a slow timelapse playback and the motion can’t be seen
- Too long of an interval gives a fast timelapse playback and the nuances can’t be appreciated (most new timelapsers make this mistake)
- Most timelapses use intervals from 1 to 10 seconds
Interval choice can be influenced by:

- Speed which objects move across the Field of View (FoV)
  - Speed of subject
  - Focal length
  - Distance to subject
  - Speed of camera movement (if using motion-control gear)
- Desired playback speed or clip duration
- Required exposure time (eg astro timelapses can require > 30s)
- Frequency of periodic motion elements (eg waves breaking)
<table>
<thead>
<tr>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 second</td>
<td>People walking, traffic, sunrise/sunset at long focal lengths</td>
</tr>
<tr>
<td>2 seconds</td>
<td>Fast moving clouds, fog/mist, city scenes at night</td>
</tr>
<tr>
<td>4 seconds</td>
<td>Clouds and sunrise/sunset at wide to medium focal lengths</td>
</tr>
<tr>
<td>8 seconds</td>
<td>Slow moving clouds or clouds shot with very wide focal lengths, Day-to-night sequences</td>
</tr>
<tr>
<td>16 seconds</td>
<td>Shadow movement</td>
</tr>
<tr>
<td>32 seconds</td>
<td>Astro timelapse</td>
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Choosing exposure settings

Many setting combinations can achieve the same exposure, but some settings are better for timelapse. In the example below, setting B is preferred over Setting A.

- Larger aperture minimizes flicker and dust spots.
- Longer shutter minimizes flicker, creates motion blur, and minimizes transient distractions such as birds in the sky.

### Setting A
- 1/250s
- f/11
- ISO 100
- No Filter

### Setting B
- 1s
- f/5.6
- ISO 100
- 10-stop ND Filter

Equivalent Exposures (but B is preferred)
Flicker

• Undesireable frame-to-frame variation in exposure, despite unchanging shooting/editing settings

• Results in an annoying stroboscopic effect in final video clip

• Not the same as *exposure stepping* due to change in exposure settings

• Caused primarily due to inconsistent mechanical actuation of camera iris and/or shutter

• Occasionally caused by certain develop settings in software
Iris Flicker

Cause:

• Variation in size of aperture due mechanical inconsistency of lens iris when stopping down

Solutions:

• Shoot at wider apertures or wide open if possible

• Lens with manual aperture control

• Lens rotation technique to lock the iris (Hold down the aperture-preview button so iris stops down, and then hit the lens release button and twist the lens slightly as if you are going to remove it from the camera. Leave the lens on the camera, but not locked into place. This disrupts the electrical connections to the lens, preventing it from changing the size of the iris. Be sure to re-lock the lens after shooting).

• Deflicker software
Shutter Flicker

Cause:

• Variation in shutter speed due mechanical inconsistency of shutter curtains

Solutions:

• Shoot at slower shutter speeds (less than 1/10s is ideal)
• Deflicker software
Software-Induced Flicker

Cause:

- Flicker created by certain editing settings, even if there was no flicker in the original footage.

- The *Clarity* slider in Lightroom/Bridge/ACR is the most common offender, especially if bright light sources flash quickly in the scene (eg car headlights pointing at lens, bright LCD billboards, etc). Other sliders which cause this phenomenon to a lesser degree are *Highlights, Shadows, Vibrance, and Saturation*.

Solutions:

- Identify editing is the cause by rendering a clip with no editing applied (all sliders at zero), then systematically test the effect of each slider until a clean clip results.

- Deflicker software applied during development (eg LRTimelapse) will not fix this. Software applied after development (eg GB Deflicker, Re:Vision) may help.
Motion blur/shutter angle

- Motion blur due to long exposures (dragging the shutter) is one of the best ways to improve timelapse by giving it a smooth, cinematic look.

- The ratio of time the shutter is open vs closed is an important concept in cinema known as **shutter angle**. For most situations, a 1:1 ratio produces the most pleasing look. For example: shutter is open for one second, then closed for one second, etc.
Importing

• A new Lightroom catalog specifically for timelapse is recommended

• Import images to a separate folder for each timelapse sequence. I recommend naming the folder with a 6-digit date code followed by a letter for multiple timelapses shot on the same day.

  130403C

  Year  Month  Day

  Indicates this is the third timelapse shot on this date

• Renaming the individual images inside the folder to include this same date code followed by a serial number is helpful and easy to do with a LR preset. For example: 130403C-0001.JPG
Basic Editing Process

For timelapses with relatively constant lighting conditions

• Edit one of the images in Lightroom and apply a 16:9 crop

• Sync settings to other images

• Export all photos as JPGs

  • Long edge 1920px (or go a little larger if you want extra room to do a Ken Burns effect in your video)

  • Quality 80%
From JPGs to Video Clip

Software tools which can assemble JPG images into a video clip:

• Quicktime Pro 7 (easy to use, but lower quality clips)

• LRTimelapse (in conjunction with Lightroom, can use the professional quality ProRes codecs, even on windows PCs)

• Panolapse

• Most popular video editing tools (Adobe After Effects, Adobe Premiere, iMovie, Final Cut, etc)
Quicktime Pro 7

- Start Quicktime Pro 7

- Go to File > Open Image Sequence

- Navigate to the folder containing the JPG files for your clip and select the first one and hit “Open”

- Select a frame rate. Choose 29.97fps for standard video, or 23.976fps for a more cinematic look (what the pros use)

- Save your clip as a self-contained movie. The resulting format is of decent quality, but not nearly as good as a professional codec such as ProRes or CineForm

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LRTimelapse Process

• LRTimelapse (LRT) is a software program which facilitates the ramping/keying of develop settings over the duration of the sequence. This is essential for timelapses shot over changing lighting conditions.

• Removes flicker

• Renders JPGs from Lightroom into high quality video codecs such as ProRes

• Works with Lightroom or Bridge by passing metadata back and forth

• Created by Gunther Wegner. Free and professional versions available, plus excellent tutorials on the website lrtimelapse.com

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LRTimelapse Process

- Having constant exposure settings often doesn’t work for dynamic lighting conditions such as sunsets. The timelapse will start overexposed and end underexposed.

- LRTimelapse allows the exposure (or any other slider) in Lightroom to change over the course of the sequence!
LRTimelapse Process

• Software program which works with Lightroom or Adobe Bridge by passing metadata back and forth to ramp/key any develop settings over the duration of the sequence

• Created by Gunther Wegner. Free and professional versions available, plus excellent instructional tutorials on his website lrtimelapse.com

• Also removes exposure flicker

• Renders JPGs from Lightroom into high quality video codecs such as ProRes (even on windows PCs)
Rendering with After Effects

Most professional timelapse artists render their clips in Adobe After Effects

- Renders straight from raw files instead of using a JPG intermediary, which reduces bit depth
- Allows use of professional codecs such as ProRes and CineForm
- Effects can be applied to clone out dust spots, sharpen, stabilize shaky footage, advanced noise reduction, etc
Rendering with After Effects

- Open After Effects and import footage by hitting ⌘i

- Navigate to the folder where your raw files and .xmp files are located. Select the first raw file and make sure “Camera Raw Sequence” is checked at the bottom of the dialog box before hitting “Open”

- When the Adobe Camera Raw window pops up, hit OK
Rendering with After Effects

• Right-click on the footage and select “New Comp from Selection”

• Add effects, if desired

• To export, go to File > Export > Add to render queue
After Effects Render Settings

- To change the type of file AE will render, click on the name of the current type to the right of where it says “Output Module” to bring up the settings dialog box.

- Click the Format Options button to open the second dialog box for selecting codecs.

First click here  Then click here
After Effects Render Settings

• Apple ProRes 422 is an excellent choice

• H264 is more compressed, but is compatible with more devices and web video hosting. If choosing this, check the box for “Limit data rate” and enter a value of about 20,000 kbps for high quality HD video

• Hit OK and specify the video resolution by checking the “Resize” box and entering 1920x1080 for full HD or whatever other resolution you prefer
After Effects Render

- After specifying all the settings, click on “Output To:” to change the file name and destination.

- Hit “Render” and After Effects will slowly render the file.

Click to change filename & location

Click here to start render
Want to learn more?

Get one-on-one coaching with Brian online using Google Helpouts. Available by the minute, or in 30-minute blocks. Schedule online at: bit.ly/HawkHelp

Also available for extended private instruction in the field. Contact directly to inquire.
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