

## **STEREOSCOPIC IMAGING: A CHEAT SHEET FOR CONCEPTS AND EQUIPMENT**

### **A. ESSENTIAL CONCEPT:**

**Two images** (a stereo pair), viewed together by two eyes, fuse into a depth image in the brain. This fusion, or **stereopsis**, is a key depth cue. Non-stereo depth cues in an image include: perspective; atmospheric haze; foreshortening; background; image lighting; and a generally "solid" appearance.

**'Stereoscopic' vs. '3d':** these terms are often interchangeable. However many video games and other computer generated images (and the software and hardware to produce them) are described as '3d' without any stereoscopic component.

The **Cascade Stereoscopic Club** is primarily interested in true stereoscopic images provided by a stereo pair. (Holography is an entirely different concept.)

This guide will focus on **the camera** as the basic capture tool.

### **B. IMAGE CAPTURE WITH CAMERAS:**

**Dedicated stereo film cameras:** quite a few models were produced during the 20th century. Operation is like a 'regular' camera, but captures two images simultaneously. Often the frame dimensions (format) is not what your local drugstore is expecting, so make sure the lab knows what you are asking it to do (usually process only.) Scanners can bring these images into a digital format.

One model, the **Stereo Realist**, set the standard for equipment used in the USA. European models are also excellent.

**Digital stereo cameras:** at this time, only the Fujifilm W3 and W1 are available. A very good choice, although prices are currently at +\$400. More brands are on the way.

**Twinned cameras:** digital and film cameras can be twinned together and produce excellent results, although the combined units can be rather bulky.

**Using a single camera:** a simple and effective method for static subjects. Take two photos that mimic the horizontal separation of the eyes.

**The stereo lens:** a variety of special lens attachments have been developed to allow 'one-eyed' cameras (usually SLRs) to capture stereo images. Some of these are available for digital cameras.

**Video cameras:** the same concepts apply to video camera capture as above.

### **C. STEREO PAIR PREPARATION:**

A captured stereo pair is typically prepared for a particular viewing technique. It usually does not matter how the image was captured.

Continued on page 2

### **STERO PAIR PREPARATION CONTINUED:**

**Anaglyphs:** the red-blue (or any complimentary color combination) glasses technique, first used in the 19th century. The glasses are cheap to buy and share and the images are simple to print. While not considered the best for color fidelity or 3d sharpness, very good results are possible. These are easily produced using computer software.

**Stereo Slides:** the 1950's stereo cameras were typically used to produce stereo slides. Today photographers must do the mounting themselves, but the process is not difficult. Stereo slides are viewed with (in full color) polarized glasses or a special stereoscope. The view-master is one type of stereo slide system.

**Digital preparations:** a variety of software exists to handle digital stereo pairs of different formats. Except for the shutterglasses technique, these are conceptually similar to traditional preparations. Google Stereo Photo Maker on the internet.

For digital projection, images must conform to a standard the projection system can handle.

### **D. IMAGE VIEWING AND EQUIPMENT:**

Usually the preparation step is taken with a particular viewing method in mind. The home computer has significantly expanded affordable choices for the artist.

**The stereoscope:** the stereoscope ranges from the 19th century stereopticon to more modern designs (the 'realist viewer', view-master, etc.) Each eye looks through an optical system that channels the appropriate images to the eyes, with a minimum of eyestrain. Images prepared for the stereoscope are typically arranged side-by-side, left to right, although some other systems exist.

**Glasses:** glasses of various types limit or filter what each eye can see, allowing the brain to fuse the images into a single scene with depth. The familiar types are anaglyphic ('red-blue') and polarizing. Images viewed with glasses are typically superimposed on one another.

**Shutter glasses:** images viewed on the computer and in some public venues are viewed with electronic shutter glasses. The glasses are synched with the monitor/projector to limit what each eye sees. The left/right components are very quickly flashed and replaced onscreen.

**Free viewing:** a stereo pair may be prepared to facilitate either 'cross-eyed' or 'parallel' free viewing, without visual aids. There can be some eyestrain, but there is no risk to eye health. Images may be prepared either l-r or r-l.

**Lenticular viewing:** In this process several left to right images are processed in the computer, and the resulting lenticular image is printed on photo paper with an ink jet printer. This print is then carefully placed under a sheet of lenticular (prism like) lenses for viewing.

**New digital presentations:** Current technology is developing to allow viewing without viewers on unique electronic picture frames, on the camera view screen, and soon on monitors and TVs.

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