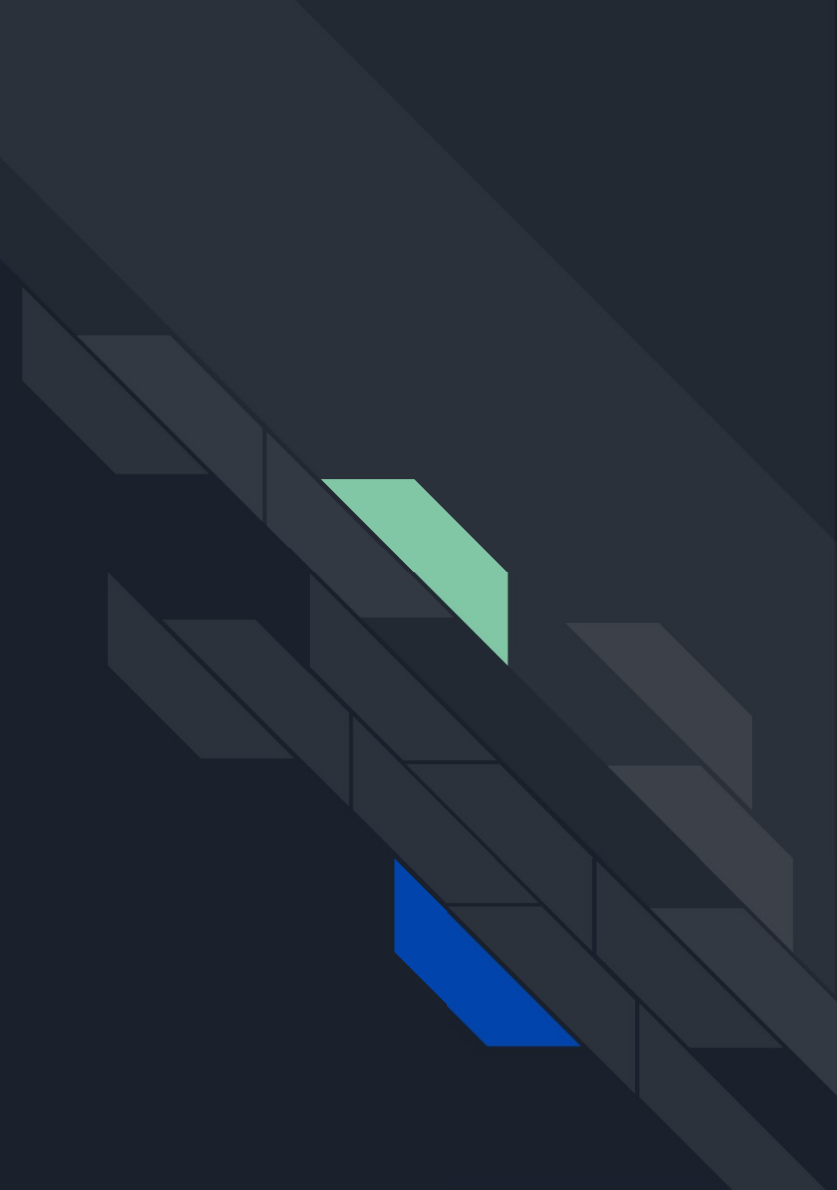




Photoshop for the Forensic Laboratory

Meredith Coon MFS, CLPE

The views expressed in this presentation are based on my training and experiences and not reflective of any past or current employer






Goals

- Establishing digital imaging policies
- Track and store digital images
- Maintain and track changes to evidentiary images
- Calibrate photographs for comparative evidence submissions

Standards



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Standard Active Last Updated: May 12, 2022

ASTM E2825-21

Standard Guide for Forensic Digital Image Processing

Significance and Use

5.1 Processed images are used for many purposes by the forensic science community. They can yield information not readily apparent in the original image, which can assist an expert in drawing a conclusion that might not otherwise be reached.

5.2 This guide addresses image processing and related legal considerations in the following three categories:

- 5.2.1 Image enhancement,
- 5.2.2 Image restoration, and
- 5.2.3 Image compression.

Scope

Version
E2825-21 Active

Language
English (United States)

Format
PDF

What is a Redline?

Price: \$57.00

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Scientific Working Group of Imaging Technology



International Association for Identification *Forensic Photography & Imaging Certification Board*

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On the following pages are the most recent best practices and guidelines published by the Scientific Working Group on Imaging Technology (SWGIT) before it ceased operations in May of 2015. Although this is no longer an active workgroup, the *Forensic Photographic & Imaging Certification Board will continue to recognize these best practices for purposes of certification testing.*

The Scientific Working Group on Digital Evidence (SWGDE), and the Organization of Scientific Area Committees (OSAC), will be continuing to work towards updating best practices, as well as establishing new best practices, as needed, within the discipline of forensic photography. All additions and changes will be monitored by the Forensic Photographic & Imaging Certification Board, and will be incorporated within the certification requirements as appropriate.

The best practices and guidelines that are used for certification testing will be referenced on the Certification Requirements page under the IAI Forensic Photography & Imaging Certification website, as well as all documents provided to applicants that describe the certification process and requirements.

Please direct any questions to either the chair or secretary of the Forensic Photographic & Imaging Certification Board, using the contact information listed above.

Respectfully,

A handwritten signature in blue ink, appearing to read "D. Eric Johnson".

D. Eric Johnson, Chair
Forensic Photographic & Imaging Certification Board
International Association for Identification

Basic Requirements

- Originals must be preserved, edits should only be done to duplicates or “working” files.
- Steps taken to a digital image need to be documented so someone else could duplicate them
 - Metadata
 - Case Notes (handwritten or typed as part of a worksheet)
- Present the digital image honestly as one that has been edited in some way
- Avoid artifacts or information that did not exist in the original

Agency Requirements

- Have procedures in place for what employees can and cannot do with software tools provided
- How will your agency will perform the following tasks with digital images:
 - Capture
 - Process
 - Store
 - Secure
 - Present/Provide

Storage

Digital images need to be stored in a way to not expose them to degradation or unauthorized access.

Especially since digital images of chemically processed prints are the **original form of evidence**, the maintenance, custody, and security should be just as if this was a physical item (firearm, blood swab or lift cards).

Image Integrity

(Section 13 in SWGIT guidelines)

Whether your agency requires a chain of custody for digital images (or not), the integrity of the files is crucial.

Your agency needs to determine:

- Steps required to maintain integrity
- Physical security/environment
- Redundancies (copies of images)
- Computer security/access to files
- Methods for transferring images to outside parties

Resolution

- Resolution refers to the amount of pixels per inch an image has while it is on a screen, or its **ppi**. The **Resolution** is how many pixels that image is made of.
- This should not be confused with how a printed picture looks, which is: how many dots of ink a printer put on the piece of paper, the dots per inch or **dpi**.
- An image's Resolution and its lossy/lossless status are independent. You can have a JPEG with a high resolution, or a TIFF with a low resolution.
- Forensic Science analysis in fingerprint examination requires a minimum of 1000ppi as established by SWGFAST.

Image Size vs Resolution

- The Image Size is how big the picture physically is, how many **inches or centimeters** wide and tall it is. How big an image is on your screen is NOT its size, your monitor can zoom in or out.
- We can perform a comparison just fine on a fingerprint that is very tall (5 inches tall for example) but in order to enter a print into AFIS or create a printed enlargement, we need our latent print images to be true to size, 1 inch in the digital image needs to be actually 1 inch tall. This is known as **calibration**.

Calibration

When Photographing an impression, something of **known dimensions** needs to be in the same frame as the latent impression.

Scales also need to be in the same **plane** as the latent print. On a curved surface, the scale needs to be right next to the impression and both the scale and impression must be captured **parallel** to the lens of the camera. This scale is in the lower part of the door frame, next to the latent impression. This allows for proper scaling to the item of evidence, not the door frame as a whole.



Resampling

Latent images need to be the **same** resolution and size as the known so the minutiae will correspond and align properly by the algorithm

Most AFIS systems require images to be imported at **exactly** 1000ppi or 500ppi.

Images between 500 and 1000ppi or greater than 1000ppi need to be **resampled**.

Resampling

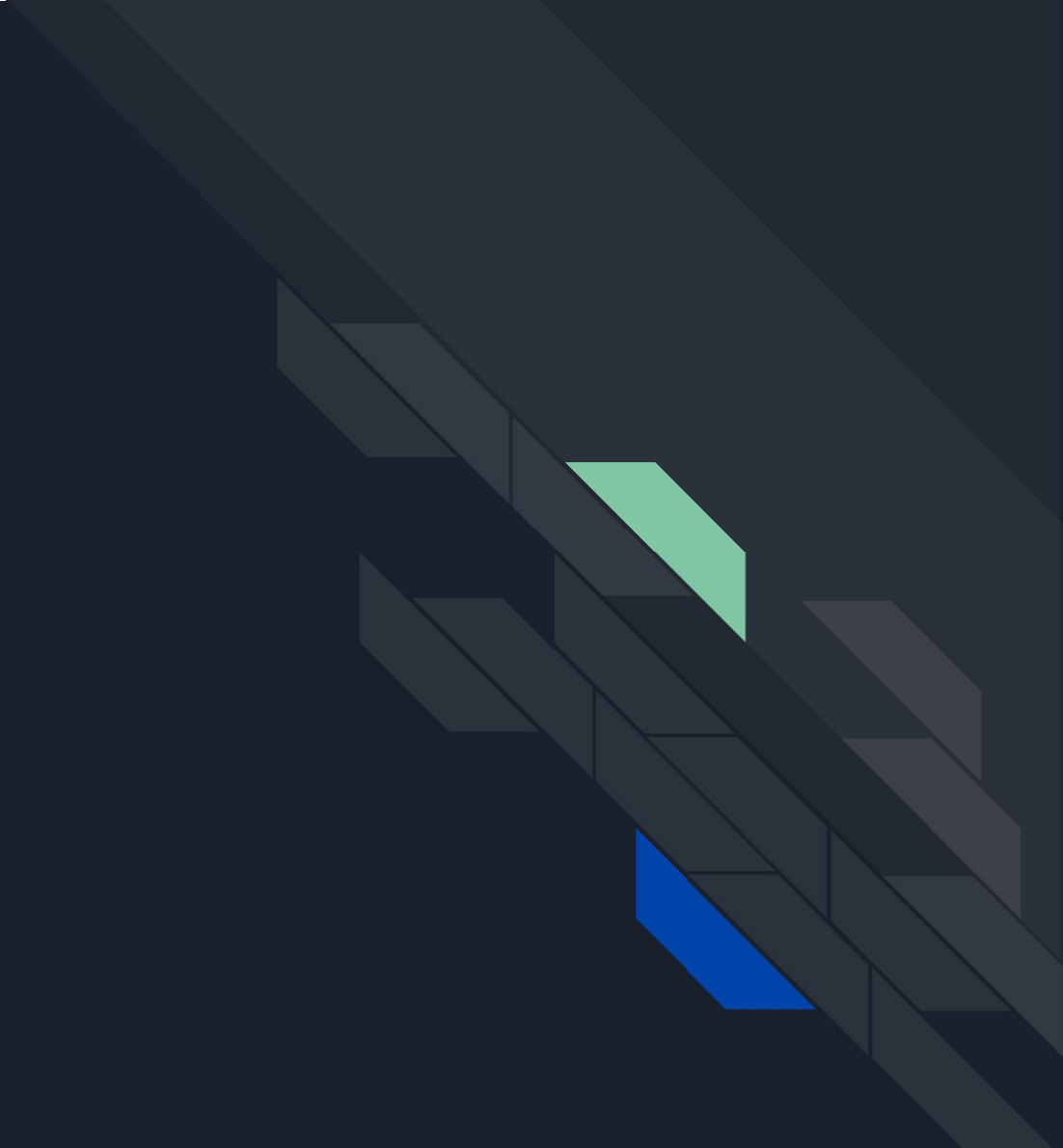
Resampling is a task performed within a photo editing software which **adds** or **discards** pixels.

Adding pixels is not proper digital image management for any forensic purpose! Never resample a pixel value “up”. This is essentially trying to make an image a higher resolution than it was captured at. The adding of pixels is considered **creating data where it didn't previously exist.**

Calibration



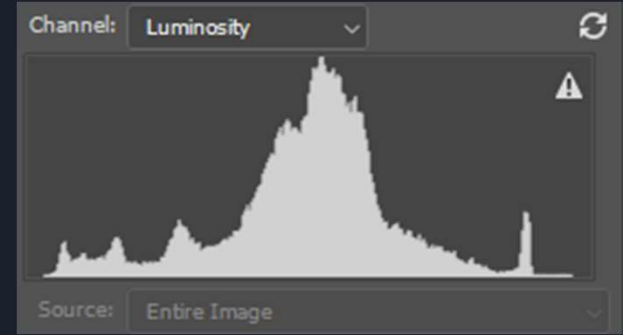
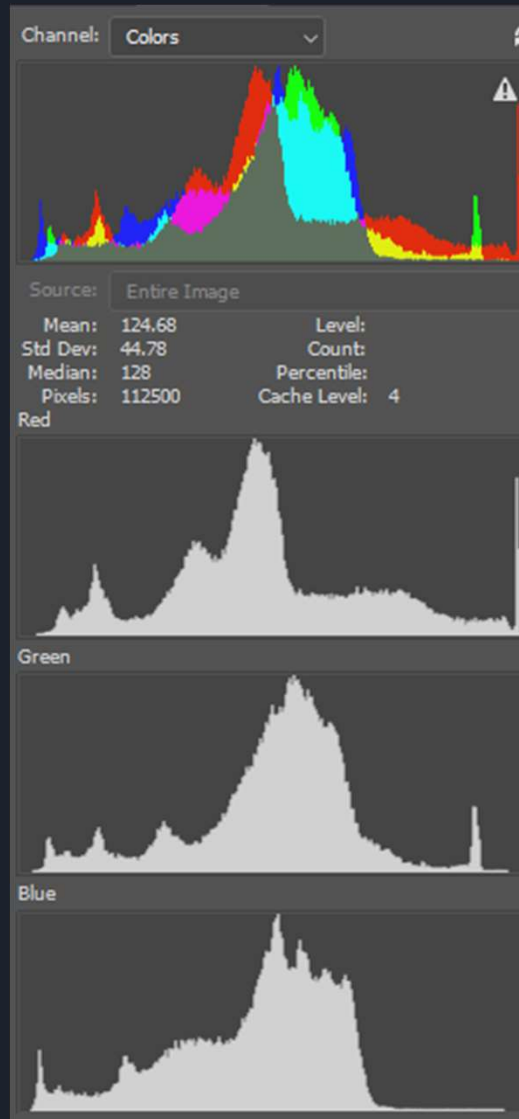
Sneak Peek!



Histogram

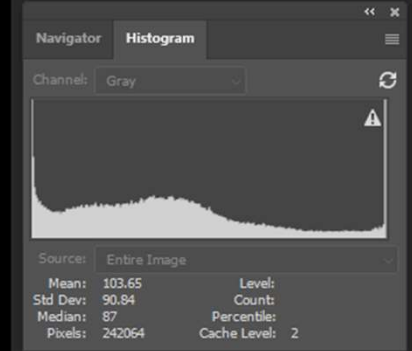
A graphic representation of the values of pixels within an image. Can reflect grayscale values or colors within an image.

Each color value in an image can be broken down into Red, Green, Blue values or described as Grayscale values. Each of the pixels within an image can be displayed using histograms.



Histogram

This latent print image contains pixels at the extreme white, extreme black and midtone ranges. The background colors surrounding this latent, as well as the black line through the left side explain the extreme edges of this histogram.





Shadows/Highlights

General rules of thumb

Light images - ridges are too light and need to be darkened

Adjust the settings within the Highlights area

Dark images - ridges are too dark and need to be lightened

Adjust the settings within the Shadows area



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