Art History
UNIVERSITY OF TORONTO

Working with Images

In this guide:

Art historians work extensively with images. This resource provides guidance and accessibility consideration for processing and working with images.

Image Resolution

Why are my images blurry? What does 300dpi mean? Higher image resolution does not equate to a larger file size. This section will offer some insights on image optimization to avoid pixelation and loss of fidelity.

Image Categories

There are two digital image categories: raster and vector.

Category	Description	Example*
Raster	• pixel-based graphics; a grid of individual dots of colours • resolution-dependent; scaling loses quality • best for complex images such as photographs • common extensions: GIF, JPG/JPEG, PNG, PSD, RAW, TIF/TIFF	
Vector	• curve-based graphics; system of lines and curves • resolution-independent; scaling without losing quality • best for digital illustrations such as logos • common extensions: AI, EPS, SVG	

* Visual examples by graphic designer Jacob Cass.

DPI/PPI and Image Size

DPI stands for "dots-per-inch," and PPI "pixels-per-inch." For raster images, 72dpi and less are low-resolution, while 300dpi and higher are high-resolution. The image quality depends on pixel density and image size. Pixelation occurs when there are fewer pixels to fill per inch. Image editing tools, such as GIMP or Photoshop, can adjust the resolution (pixels/inch) and size (width and height). If you plan on editing the image again in the future, save the image in a lossless format such as PNG. Lossy formats such as JPG/JPEG loses quality each time they are opened, edited, and saved.

Vector images can be resized without any loss of quality.

Free Image Editing Tools

Below is a list of free image editing tools to help you process your images.

Tool	Platform
Compressor.io	Online
GIMP (GNU Image Manipulation Program)	Windows, macOS, Linux
Pixlr	Online
Sumopaint	Online

File Formats

Which file format should you use? The answer depends on your context. Below is a list of standard image file formats.

Extension	Pros	Cons	Best for
AI (Adobe Illustrator Artwork)	• edits are customizable and reversible • scalable • manageable file size	• not supported by any browsers • not supported by any standard image viewers or editors	• Adobe Illustrator projects
BMP (Bitmap)	• lossless (no compression) • very high-quality images • supported by all major browsers	• huge file size • outdated proprietary format (Microsoft)	• archival copies
EPS (Encapsulated PostScript)	• lossless (no compression) and scalable • saves vector information	• not supported by browsers • opens in Adobe Illustrator or CorelDRAW	• vector artwork

Extension	Pros	Cons	Best for
GIF (Graphics Interchange Format)	• lossless (no compression) • smaller file size • animated • saves transparencies • supported by all major browsers • supported by all major operating systems and standard image editors	• limited to 256 colours (8-bit)	• web images • animated images
HEIC/HEIF (High Efficiency Image File)	• high-quality images • smaller file size	• not supported by any major browsers • download extension to open in operating systems	• live photos
JPG/JPEG (Joint Photographic Experts Groups)	• 16 million colours (24-bit) • smaller file size • supported by all major browsers • supported by all major operating systems and standard image editors	• lossy compression	• web images • non-professional printing
PDF (Portable Document Format)	• lossless (no compression) and scalable • displays raster and vector graphics • includes interactive elements • supported by all major browsers • universal tool	• load and read as a separate file online • not supported by image editing software	• store graphics for later printing • interactive visual reports
PNG (Portable Network Graphics)	• lossless (no compression) • 16 million colours (24-bit; PNG-24) • saves transparencies	• larger file size (than JPG/JPEG) • PNG-8 is similar to GIF; 256 colours (8-bit)	• web images
PSD (Adobe Photoshop Document)	• edits are customizable and reversible • saves layers	• larger file size due to layers • not supported by any browsers • not supported by any standard image viewers or editors	• Adobe Photoshop projects

Extension	Pros	Cons	Best for
SVG (Scalable Vector Graphics)	• lossless (no compression) and scalable • smaller file size • animated • saves transparencies looks great at any size • supported by all major browsers	• not ideal for complex images	• logos, icons, simple illustrations
TIF/TIFF (Tagged Image File Format)	• lossless (no compression) • very high-quality images • saves transparencies • saves layers	• huge file size • limited browser support	• archival copies • professional publications • high-quality prints
Various Extensions* (RAW Image File)	• unprocessed digital camera data • very high-quality images • more shades per colour channel • saves metadata	• huge file size • proprietary format depending on the camera • post-process and conversion	• photography

* Popular RAW Image File extensions include Canon CRW CR2 CR3, Epson ERF, Kodak CR, K25, KDC, Nikon NEF NRW, Olympus ORF, Panasonic RW2, Pentax PEF, Sony ARW, SRF, SR2.

File Names

When managing hundreds, if not thousands, of image files, file name structure can save you time and effort. There is no "correct" method of file organization. Instead, aim for **consistency** and be **descriptive**. The file name can include information such as:

- Date (YYYMMDD or YYMMDD)
- Project name (use abbreviations or acronyms)
- Location information
- Researcher's name or initials
- Version number (use a sequential numbering system with leading zeroes)

The file name should not be too long, up to 15 characters. (Windows only permits 256 characters for the pathname, i.e., the filename plus all parent directories.) Do not use special characters and avoid spaces. Use letters and numbers with underscores, dashes, and camel cases to create descriptive file names. After creating a file naming structure, record your conventions and codes in a README.txt file.

Metadata

Metadata is the data about data. Some metadata are automatically generated, such as the date, source, and GPS location. Double-check that the technical data stick with the image and consider adding other information, including tags and keywords. Much like your file name structure, be consistent.

Free Image Management Tools

Tool	Description
Tropy	Designed by researchers, for researchers, Tropy is a simple yet powerful desktop program that allows you to organize and describe research photos so you can quickly find them, and their associated data, easily. Photos can be grouped into individual research documents or objects, and documents can be grouped into collections or tagged. Tropy also allows for notes to be added to describe or transcribe your research images, and features basic image manipulation tools such as zoom, crop, and rotate.

Colour Systems

System	Description
CMYK (Cyan, Magenta, Yellow, Black)	• printing; offset and digital printing • "subtractive" process; tiny dots of cyan, magenta, yellow, and black overlap to produce colours • AI, EPS, PDF files
HEX (Hexadecimal Colour)	• onscreen; websites • six-digit letters (A–F, a–f) and numbers (0–9) combination
PMS (Pantone® Matching System)	• printing; offset printing only • patented colours, standardized colour inks
RGB (Red, Green, Blue)	• onscreen; online applications, TV • "additive" process; red, green, and blue lights are added together to produce colours • GIF, JPG/JPEG, PNG, PSD files

Avoid using colours as the sole means of conveying information. For example, in this guide, a combination of colour and font style is used to differentiate the headings from the body text.

Colour Contrast

The Web Content Accessibility Guidelines (WCAG) sets the minimal colour contrast between the text (foreground) and background. Use the eyedropper tool to select the colours for inspection. (For Chrome and Firefox users, ColorZilla is a handy eyedropper tool.) Once you have selected the colours, insert the six-digit hexadecimal colour codes into the WebAIM Contrast Checker to check if you meet the WCAG 2.0 level AA.

Alternative Texts

The University of Toronto is committed to the principles of the Accessibility for Ontarians with Disabilities Act (AODA). According to the [Ontario Regulation 191/11, section 14](#), by January 1, 2021, all internet websites and web content must conform with WCAG 2.0 Level AA, other than success criteria 1.2.4 and 1.2.5.

WCAG 2.0 Guideline 1.1 states that all non-text content requires a text alternative. Text alternatives can be changed into other forms and processed by screen readers and speech input software while supporting search engine optimization. The alternative text provides accurate and concise information on the **content** and **function** of the image. The text will change depending on the context. Is the image functional, advanced, or decorative?

Image Type	Description
Functional	• image is a visual representation of the text* content • provide a standard 125-character alt text • insert an image caption; the image caption is not the same as the alt text (captions often include the copyright information, alt text does not)
Advanced	• image contains substantial information that cannot be conveyed in a 125-character alt text • provide a long description that describes the image's content and function • use the standard alt text space to direct users to the location of the long description
Decorative	• image does not convey meaning; used for aesthetic purposes • linked images are never decorative • no alt text (alt="")
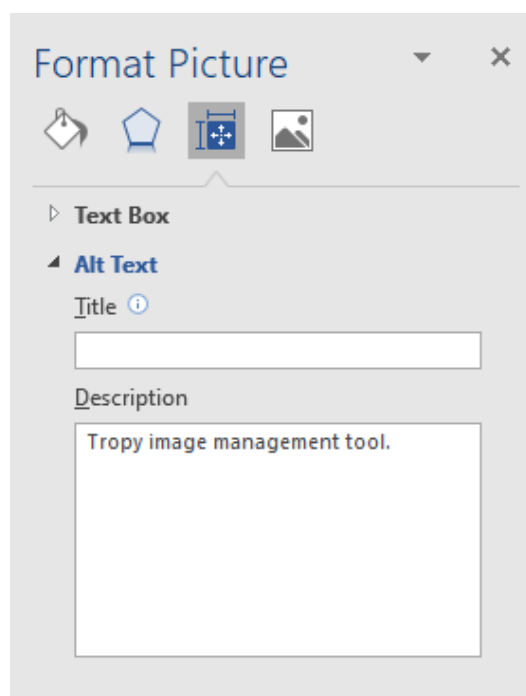
* Speaking of text, use actual text instead of image-based text when possible. True text is more flexible than images. Genuine text can be resized, modified, and customized (font, colour, etc.). Images are less flexible and may be distorted or pixelated. When image-based texts are used, the text alternative must contain the same text presented in the image.

When writing alternative texts, avoid phrases such as "image of" or "photo of" because the screen reader will already have identified the image element. However, if the medium is crucial to the content of the function of the image, include the information in the alternative text. Use punctuation in the alternative text to improve readability.

Still having trouble deciding how and when to provide alternative text? Consult the [World Wide Web Consortium (W3C)'s alt Decision Tree](#) for further guidance and visit [WebAIM's Alternative Text article](#) for alt text examples.