Beginner Session

GUIDELINES FOR PREPARING DIGITAL ART

2009 ASPB Annual Meeting
July 19, 2009

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The Sheridan Group Journals
Topics

General Submission Guidelines for the following ASPB journals:

The Plant Cell
Plant Physiology

Including:

Imaging Foundations
RGB Image Submission and Color Management
Preparation Tips
Vector Images
Vector Images

- Vector graphics are made up of lines and curves called *vectors*.
- Created in drawing programs such as Illustrator, Freehand, CorelDraw, Word, PowerPoint.
- Vector graphics are *resolution-independent*.
- Fonts need to be embedded or converted to outlines or paths. Lines minimum of .25 pts.
Raster Images
Raster Images

- Raster images are made up of pixels.
- Created by capture devices such as digital cameras and processed in image editing programs such as Photoshop.
- Raster images are *resolution dependent*.
- Text and lines are raster elements and are not editable.
DPI vs. PPI

- This is the number of pixels per inch in your image. This will affect the print size of your photo and will affect the quality of the output. The way that it will affect the quality of the output is that if there are too few pixels per inch, then the pixels will be very large and you will get a very pixelated image (jagged edges, you will actually see individual pixels, not good). You'll hear various different numbers thrown around as to what an acceptable PPI for a print-out is. A lot of this will depend on the size of the print. This is because you look at large prints from a further distance than a small print, so you can get away with a lower PPI and still have the image look fine.

- Anyways, all that PPI does is affect the print size of the image. There are 2 ways that you can change the print size, by resampling or by not resampling. Not resampling is what you normally want to do, this will only change the size of the print out. Using resampling will actually change the number of pixels (and thus the file size) in order to match the print size. So for instance, if you don't resample, changing the PPI setting will increase or decrease the print size (it will increase if you drop the PPI, it will decrease if you increase the PPI). With resampling, if you change the PPI, you will loose pixels (if you set the PPI to a lower value) or you will have pixels created (if you increase the PPI). Creating pixels is a bad idea, they get generated by the computer and the results aren't usually that good. Throwing away pixels is fine as long as you won't need the bigger size later (that's why it's usually a good idea to save the original large file).
Now let's talk about DPI. DPI only refers to the printer. Every pixel output is made up of different coloured inks (usually 4 or 6 colours, depending on your printer). Because of the small number of colours, the printer needs to be able to mix these inks to make up all the colours of the image. So each pixel of the image is created by a series of tiny dots (you could think of them as sub-pixels). Generally, the higher the DPI, the better the tonality of the image, colours should look better and blends between colours should be smoother. You'll also use more ink and the print job will be slower. You might want to try setting your printer to a lower DPI to save ink and speed up the job, see if you notice any difference in quality. The lowest setting where you don't see any loss in quality should be the best one to use.

So a 1200 dpi printer uses 1200 dots of ink in every inch to make up the colours. If you were printing a 300 PPI image, then every pixel would be made up of 16 smaller ink dots \((1200 \text{ DPI} \times 1200 \text{ DPI} / 300 \text{ PPI} \times 300 \text{ PPI})\). A lower DPI would have fewer ink dots making up each pixel, which would make the colour look worse. A higher DPI would have more ink dots for each pixel and should give more accurate colour (especially under close examination).
Resolution

72 ppi

300 ppi
Effective Resolution

- Actual resolution factored for scaling

50 picas (8.33 inches) @ 160 ppi

21.6 picas @ 370 ppi
Resampling
Printing Process

- Halftone Screening
Printing Process

- Halftone Screening
Types of Images

- Line Art
- Halftones
- Combinations
Line Art Images (Bitmap)

- Images comprised of black and white elements only
- 1000 ppi minimum resolution
- 1200 ppi preferred for thin line reproduction
Line Art Images (Bitmap)
Line Art Images (Bitmap)

1000 ppi

600 ppi

300 ppi
Halftone

- Image only
- Grayscale or color
- 300 ppi minimum resolution
Halftone
Combination (Combo)

- Halftone and line art combined
- Grayscale or color
- 600 ppi minimum resolution
- 1000 - 1200 ppi maximum resolution
Combination (Combo)

Diagram A:
- 1) free pigment
- 2) monomeric Lhc
- 3) trimeric LHCII
- 4) PSII core
- 5) PSI-LHCI

Diagram B:
- α-DM 0.5%
- Triton 5%
- Triton X-100 5%
- Thylakoids
- Time (min)
- Fluorescence (a.u.)

Graphs showing different lines for:
- WT
- WT light-treated
- npq1
- npq2
File formats

TIFF – Tagged Image File Format
EPS – Encapsulated PostScript
JPEG – Joint Photographic Experts Group
GIF – Graphics Interchange Format
PDF – Portable Document Format
MS OFFICE – DOC, PPT, XLS
Recommendations...

- TIFF
- EPS

Also acceptable, if prepared correctly:
- JPEG (compression)
- PDF (Distiller Settings)
- *Microsoft Office (Guidelines and settings)
Fonts and font embedding

- Use standard font families when labeling images and be consistent throughout your images
  - Helvetica or Arial
  - Times Roman
  - Symbol
  - Mathematical Pi
  - European Pi
Font embedding

- When submitting vector files either embed the fonts (when possible) or convert to outlines
Font embedding

- Adobe Illustrator
Font embedding

- Microsoft PowerPoint
File compression

**Lossless Compression**
- LZW, ZIP, CCITT G4

**Lossy Compression**
- JPEG
File compression

- Lossless techniques
- JPEG compression
Color Mode

whole Gamut of human color perception

RGB Gamut

CMYK Gamut
Color Mode

Author Supplied CMYK

Converted CMYK

Author Supplied RGB
RGB Submission

- RGB captures the original science
- Easier for authors
- Color managed conversion to CMYK
- Opportunity for full gamut RGB online
ICC Profiles

- Describe a device’s ability to render color
- Necessary for accurate conversion to CMYK
ICC profiles

- Adobe
- Ricoh
Embedding ICC profiles

- Adobe Photoshop
- Adobe Illustrator
Preparation Tips...
Find balance of quality/size

IMAGE SIZE: 3” x 4” 600 ppi

- RGB EPS 24.7MB
- RGB TIFF with NO compression 8.9MB
- RGB TIFF with LZW 3.3MB
- RGB JPEG, Quality 8 354 KB

IMAGE SIZE: 3” x 4” 300 ppi

- RGB TIFF with LZW 1.6MB
Print quality digital photos

- Choose settings that maximize quality
- JPEG and RAW formats most common
- JPEG quality settings = compression
- RAW format is the new digital negative
- Capture in RAW, convert to TIFF
Print quality digital photos
Print quality digital photos
**Canon EOS Rebel XTi**

- **Image Format**
  JPEG, RAW (14-bit Canon original)

<table>
<thead>
<tr>
<th>Quality</th>
<th>File Size (Approx.)</th>
<th>Pixels Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large/Fine</td>
<td>4.3MB</td>
<td>4272 x 2848</td>
</tr>
<tr>
<td>Large/Normal</td>
<td>2.2MB</td>
<td>4272 x 2848</td>
</tr>
<tr>
<td>Medium/Fine</td>
<td>2.5MB</td>
<td>3088 x 2056</td>
</tr>
<tr>
<td>Medium/Normal</td>
<td>1.3MB</td>
<td>3088 x 2056</td>
</tr>
<tr>
<td>Small/Fine</td>
<td>1.6MB</td>
<td>2256 x 1504</td>
</tr>
<tr>
<td>Small/Normal</td>
<td>0.8MB</td>
<td>2256 x 1504</td>
</tr>
<tr>
<td>RAW</td>
<td>15.3 MB</td>
<td>4272 x 2848</td>
</tr>
</tbody>
</table>
Optical vs. Digital Zoom

10X Optical Zoom

10X Digital Zoom
Think bigger…
Alternate applications

- Adobe Photoshop Elements
- Web-based Image Editors (Picnik, PS Express)
- Open Source applications (Gimp)

*Just be aware of lack of color management support*
Screen Captures
Screen Recording
Avoid Pattern Fills

- Do not use pattern or textured fills in graphics.
- Use solid fills or percentage screens.
- A 20% difference in percent screens is most effective for differentiation.
Crop Excess White Space

- Use Adobe Photoshop’s Trim Feature
Online Preflight

http://dx.sheridan.com/
Presentation available at:

Site:
http://webftp.dartmouthjournals.com/ftp/ftplogin

Username: digexp
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