NIH Eunice Kennedy Shriver National Institute of Child Health and Human Development

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Tips for Making Figures for Publications, Grants, Presentations

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Abbott Nutrition   MeadJohnson Nutrition

PRS2018 Workshop ©KH Albertine

I have no financial relationship so no conflict of interest
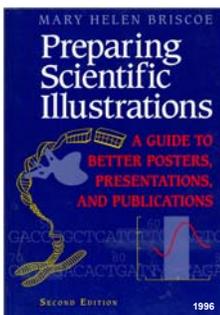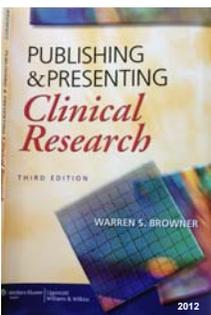
Digital Arts Training

❖ **This presentation provides guidance for Photoshop and Word**

- ● **I, and my family, have no financial or other interest in Adobe or Microsoft or their products so I have no conflict of interest**

- ● **Most universities offer discounted software to faculty and staff**

What Do All of These File Formats Do?

❖ **Lots!**

File Formats

❖ **Photoshop document (.psd)**

- ● **Proprietary file format for Photoshop**

- ● **Saves all of the format information (size, resolution, depth, etc.)**

- ● **Desirable as the 'archive' file (your 'original') for images**

  - ● **Why do this?**

    - ● **The file type name stands out: the suffix is ".psd"**

- ● **Limitation: no thumbnail image**

File Formats

❖ **Tagged image file format (.tiff; .tif)**

- ● **The standard file format for maximum flexibility of images**

- ● **Saves all of the format information (size, resolution, depth, etc.)**

  - ● **Full-size set by image capture device (e.g., MRI, CT, etc.)**

    - ● **Advice: save to your computer as ".psd" so that you know that you saved the 'original' imaging files**

- ● **Further advice: Resave the ".psd" files as ".tiff" files for your 'working' files, which have thumbnail images**

  - ● **So that you do not lose the 'original' image files**

File Formats

❖ **Map of bits (.bmp)**

- **File formatting method that will/will NOT shave pixels when saved (this is called compression)**
  - **Compression is optional (I do not compress)**
  - **Referred to as "Non-Lossy" compression**
- **Useful for small but zoomable pictures to be pasted in Word docs for grant applications and PowerPoint presentations**
 - **The compressed images will not pixelate, if made as to be taught**

File Formats

❖ **Joint Photographic Experts (.jpeg)**

- **File formatting method that compresses images (shaves pixels) to make the file smaller (e.g., to attach to email)**
- **Degree of compression is adjustable, allowing selectable tradeoff between file size and image quality (zooming without pixilation)**
- **Typically achieves 10:1 compression**
  - **May cause *perceptible* loss in quality when zoomed (pixilation)**
  - **Referred to as "Lossy" compression**

Non-Lossy Compression

TIFF → **BMP**

Large file size

Non-Lossy Compression

TIFF → **PNG**

Large file size

Lossy Compression

TIFF → **JPEG**

Large file size

Small file size
- **Easy to "send"**
- **Low resolution**
- **Cannot zoom much**
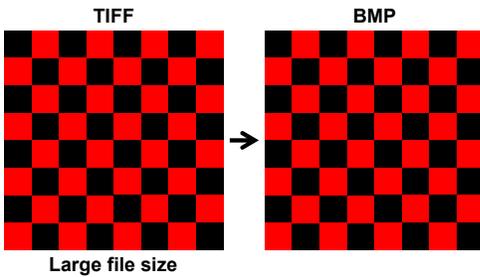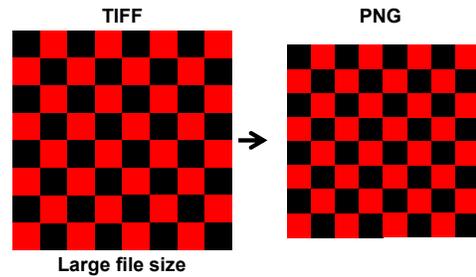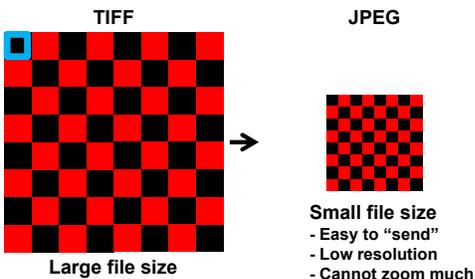
Image File Format Matters
- Zoomed to equal height -

TIFF   BMP   JPEG
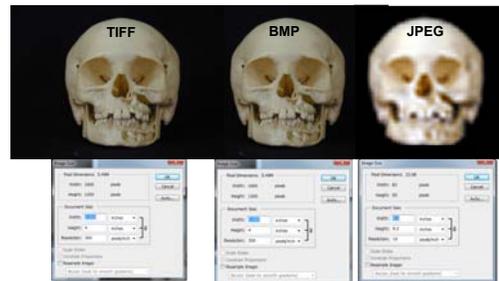
Images from Dr. Bo Foreman, UofU

Other Terms to Know for Digital Artwork

❖ **Mode**
❖ **Size**
❖ **Resolution**

Mode

❖ **Adjust "mode" (RGB, CMYK, gray scale, B/W)**
  ● **RGB, red green blue**
    ● **WYSIWYG; not calibrated; small file size**
      ● **Optimal for online content**
  ● **CMYK, cyan magenta yellow black**
    ● **Numeric definition of colors; large file size**
      ● **Optimal for print content to appear the same everywhere**
      ● **Limitation: cannot make a .bmp file in Photoshop**
  ● **Follow "*Instructions to Authors*"**

Size

❖ **Adjust "size"**
  ● **Inches or centimeters, typically**
  ● **Set according to journal branding**
  ● **Follow "*Instructions to Authors*"**

Resolution

❖ **Adjust "resolution"**
  ● **Pixels-per-inch (PPI) for monitors**
    ● **FYI: dots-per-inch for printers**
  ● **Color figures (CMYK and RGB): 300 ppi**
  ● **Gray scale figures: 600 ppi**
  ● **Black-and-white figure: 1200 ppi**
  ● **Follow "*Instructions to Authors*"**

Printers' Expectations (Production)

❖ **Encapsulated PostScript (EPS) file**
  ● **For journals/textbooks that are printed**
    ● **Printers typically require this file format**
    ● **Self-contained, reasonably predictable documents that describe an image**
      ● **For printers' self-protection**
    ● **Placed in another PostScript document (*e.g.*, printer's page-proof)**
    ● **Read the "*Instructions to Authors*"**

My Concept of 3-4-1

❖ **Archive file: Easily recognized; do not lose (".psd")**
❖ **Working file: Exactly what the name states (".tiff")**
❖ **Make publication-quality figure file: format that printers require – read *Instructions to Authors***
  ● **Retain mode, size, and resolution according to journal branding**
❖ **Make pasting-quality figure file: format that is small yet zoomable**
  ● **Word, PowerPoint, Excel, *etc*.**
    ● **Caveat: NIH's PDF-file converter reduces resolution, including figures**
      ● **My solution: Paste-in high-resolution figure files**

Brief Review: Archive vs Working Files

❖ Original image
  ● ".psd" for archive (Photoshop document)
❖ Convert to a different file type
  ● ".tiff" file format for working file
    ● To show thumbnails of the picture

3-4-1 Approach: Make Pasting-Quality Figure Files

❖ Make publication-quality figure file
❖ Make pasting-quality figure file
  ● Large image size for inserting into Word (grant application) and small image size PowerPoint (slide presentation)
  ● Save the modified file
    ● Use a systematic file naming routine
  ● Save the file as an optimized, zoomable file
    ● Map of bits (.bmp)
    ● Insert the file into Word or PP or Excel, *etc.*

Kurt's 11 Steps

1. Save a new image file as ".psd" file in Adobe Photoshop – *This is your archive file; do not lose it!*
2. To create the working file, open 'File' tool bar, select 'Save As'; in the drop-down window, select "Format" to save the file as a tiff doc ('.tiff')
3. Open 'Image' tool bar; open 'Mode' to select image type (CMYK[a], RGB, gray scale, *etc.*; [a]cannot compress as ".bmp" file)
4. To optimize color, brightness, and contrast of the file, open 'Image' tool bar; sequentially select 'AutoTone', 'Auto Contrast', 'Auto Color' (notice that every picture's appearance changes the same. This is good! Alternatively, to set blackness constant (e.g., immunoblot), select 'Adjustment' and then 'Level' to use the black dropper to standardize blackness
5. To save this version, open 'File' tool bar, select 'Save As'; in the drop-down window, extend the file name to keep track (*e.g.*, I add '_b')
6. To change the 'Document size', without losing resolution, open 'Image' tool bar; open 'Image', Unclick 'Resample'; change 'Width' to 6 inches (notice that the resolution of the image increased. This is good!) – *I use 6-inch width size because it fits a PP slide, with room for the title and text*
7. To save this version, open 'File' tool bar, select 'Save As'; in the drop-down window, extend the file name to keep track (*e.g.*, I add '_b 6in_w') – *This is the high-resolution file for manuscripts AND to insert into NIH grants!*
8. To make a zoomable file that will not pixelate in a grant, open 'File' tool bar, select 'Save As' and select 'bmp' (file name's suffix will be '_b 6in_w.bpm'); FYI: this file will be large size, which is necessary for the outputs
9. To reduce the image size for a PPP, open 'Image' tool bar; open 'Image' and click the 'Resample' box so that a check mark is shown; change 'Resolution' to 200 pixel/inch (notice that the picture gets smaller. This is good!)
10. To save this version, open 'File' tool bar, select 'Save As'; in the drop-down window, extend the file name to keep track (*e.g.*, I add '_b1 6in_w 200ppi')
11. To make a zoomable file that will not pixelate, open 'File' tool bar, select 'Save As' and select 'bmp' (file's name suffix will be '_b1 6in_w 200ppi.bmp'); Insert this file into your PPP

Transition to Demo

Telegraph Cove, Vancouver Island, BC; Canada, Sep 2015

How Many of You Experienced Bouncing of Inserted Pictures in Word?

❖ My solutions, through discovery
  ● I will gladly take royalties!
  ● To insert a picture file in a Word doc
    ● Insert a "Text box" on the page
    ● Insert the picture file in the text box
    ● Select "Position" on the page
  ● The key:
    ● "Insert page break" at the bottom of each Word page that has a picture file inserted

Photo by KAlbertine 082117

Thank you