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# **INKJET PRINTING** MAKING IT LOOK THE WAY YOU WANT





#### Topics

- Printers
- Inks and papers
- Inks for black & white
- The printing process
- Matching the screen image to the print
  - calibrating
  - soft proofing

# Inkjet ("Giclee") Printers

- Canon
  - Pixma series (8- and 13-inch carriage; 4-6 inks)
  - ProGraf series (17-inch carriage; 12 inks)
- Epson
  - Stylus Photo series (8- and 13-inch carriage; 4-8 inks)
  - Stylus Pro series (17-inch to 44-inch carriage; 8 inks)
- Hewlett Packard
  - Photosmart series (8- to 13-inch carriage; 6 inks)
  - Designjet series (18- to 24-inch carriage; 6 inks)

## Inkjet Printers: Current Favourites

- Canon
  - Pixma series
  - ProGraf series
- Epson
  - Stylus Photo series
  - Stylus Pro series
- Hewlett Packard
  - Designjet etc.

## **Printer Considerations**

- Output
  - size
  - quality
  - longevity
- Reliability
- Profile availability
- Cost (purchase and operating)
- Speed
- Noise
- Physical size

## Inks

#### Dye-based (Canon / Hewlett Packard)

- Wide gamut / vivid
- Shorter but increasing life
- Expensive

#### **Pigment-based** (Epson)

- Narrower but improving gamut / less "pop"
- Longer life but advantage narrowing
- Expensive
- Third-party
  - Usually dye-based
  - Gamut, hue and lifespan unknown
  - Relatively inexpensive
  - Not recommended for commerce (gift cards?)

## **Specialty Inks**

- Ink for black and white-only printing
  - Lyson bulk ink systems
  - Piezography (Cone) system
- Continuous-feed Systems
  - <u>http://www.continuousink.com/</u>
  - <u>http://www.nomorecarts.com/</u>
  - <u>http://www.inksupply.com/</u>
  - etc.

## Papers: Key Attributes

- Appearance
  - colour, contrast, gamut and reflectivity
- Weight and durability
- Print longevity

(see http://www.wilhelm-research.com/)

- Cost
- Format (cut vs. roll)

## Paper Types

- Matte
  - Low contrast, gamut and reflectivity
  - Usually lower cost
  - Various colours (bright white to cream)
  - Good durability & excellent fade resistance (up to 100 yrs with pigment inks)
- Semi-Gloss / Luster / Glossy
  - Higher contrast, gamut and reflectivity
  - Higher cost
  - Usually bright white
  - Acceptable durability & fade resistance (up to 40+ years)
- Fine Art
  - Low contrast, gamut and reflectivity
  - Higher cost
  - Various colours (bright white to cream)
  - Acceptable durability & fade resistance (up to 40+ years)
- Specialty e.g. Canvas, Watercolour
  - Low contrast, gamut and reflectivity
  - Highest cost

#### Paper: Recent Releases

- Crane Museo Silver Rag
- Epson Exhibition Fiber
- Harman Gloss
- Hahnemuhle Fine Art Pearl, Fine Art Baryta
- Innova Fibagloss
  - High D-max (up to 2.4!)
  - High reflectivity
  - High weight
  - High longevity
  - High cost
  - Low availability

## Printing in Photoshop

- Key choices
  - Print size and quality
  - Colour management: Photoshop or printer?
  - Paper size, type and quality
  - Print location on page
  - Photoshop CS2 or CS3

#### Image Size: What is It?



# Image Size: What is It?

| Image Size                             |               |                 |                              |
|--|---------------|-----------------|------------------------------|
| Pixel Dimensions: 2.86M                |               |                 |                              |
| <u>W</u> idth: 1000                    | pixels 🔽 🗖 🖉  | Reset           |                              |
| <u>H</u> eight: 1000                   | pixels        | Auto            |                              |
| Document Size:                         |               |                 |                              |
| Wi <u>d</u> th: 4                      | inches 🔽 🔪    | Image s         | ize depends                  |
| Hei <u>a</u> ht: 4                     | inches 🔽 📕    | on n            | umber of                     |
| Resolution: 250                        | pixels/inch   | pix             | els <u>only.</u>             |
| ✓ Scale Styles ✓ Constrain Proportions |               | AOTBE,<br>means | more pixels<br>bigger prints |
| Resample <u>I</u> mage: Bicut          | oic Sharper 💌 |                 |                              |

## Image Size Example 1: Change Islands



#### AOTBE, document (print) size depends on image width & height only

## Size Example 1: Change Islands (cont.)



Doubling the number of pixels on each side of the image file doubles the length of each side of the print, without affecting print quality (ppi)



2400 pixels / side

#### Image Size Example 2: Cracks



How can the same number of pixels produce the same print size but different pixel dimensions?

## Image Size Example 2: Cracks (cont.)





#### Pixel dimensions depend on image size <u>and</u> bit depth

## Image Size Example 3: The Skunk



How can the same number of pixels lead to the same pixel dimensions but different document (print) size?

# Image Size Example 3: The Skunk (cont.)



#### Print dimensions depend on image size and printer PPI

# Image Size, Pixel Dimensions and Print Size

#### Image Size depends on

Number of pixels on each axis (H x W = megapixels)

#### Pixel Dimensions depend on

- Image size
- Bit depth (8 or 16 bits)

#### Print size depends on

- Image size (not file size or pixel dimensions)
- the pixels per inch (PPI) setting of the printer

# Managing Print Size



#### For a given image size, print size is a simple function of the Pixels per Inch setting

## How Many Pixels per Inch Do You Need?

- No universal answer: printers, papers and inks differ
- Not even a widely agreed answer.....
- ..... but many agree that 240 360 PPI is optimal
- ..... and many prints look good at PPI as low as 180

#### Not Enough Pixels? Too Many? Re-sampling To Manage Image Size

| Image Size   | Image Size 🛛 🔀   |
|--|--|
| Pixel Dimensions: 9.00M       OK         Width: 2048       pixels       ✓         Height: 1536       pixels       ✓         Document Size:       Width: 17.34       cm | Pixel Dimensions: 2.25M (was 9.00M)   Width: 1024   pixels Image: Control of the section of the s |
| Height: 13 cm V<br>Resolution: 300 pixels/inch V<br>Scale Styles<br>Constrain Proportions<br>Resample Image: Bicubic Sharper V   | Height: 6.5 cm   |



# Re-sampling To Manage Image Size

- Re-sample a little bit at a time (maybe)
- Scale Styles and Constrain Proportions (usually)
- Use bicubic sharper when down-sizing
- Use bicubic smoother when up-sizing

#### File Sizes and Print Sizes: Bit Depth, PPI and DPI

- Changing print pixels per inch (PPI) changes print size but not the number of pixels, hence does not change file size
- Re-sampling changes the number of pixels, hence it affects both print size and file size. It may also affect image quality
- Changing printer dots per inch (DPI) e.g. from 720 dpi to 1440 dpi - changes <u>print</u> quality but not file size, print size or image quality
- Changing image bit depth changes file size and potentially image quality, but not image or print size

#### **Printing: Basic Steps**

- Finalise image
- Flatten and save under a new name
- Re-size and sharpen if necessary
- Set and view proof colours
- Check Gamut Warning
- Adjust colour as needed
- Choose Print With Preview....

## **Flatten Before Printing**



- Speed and simplify the printing process
- Allow print-specific layers (e.g. color, contrast etc.)
- Allow print-specific sharpening
- Sometimes useful to use Flatten
   Visible Layers only

## **Re-Size and Sharpen Before Printing**

- Match image size to print requirement (i.e. print at 180-360 PPI): re-sample as necessary
- Sharpen using unsharp mask or similar (prints often need a little extra)

## Set and View Proof Colours



- Gives "soft proof" of final print
- Evaluate contrast etc. before printing

## **Choosing a Custom Proof Setup**

| Ps Ado                                | be Photoshop CS3 - [Alona_Panorama1.jpg @ 117% (RGB/8*/Hahr  | Customize Proof Condition   |  |   |
|---------------------------------------|--|---|--|---|
| Eil                                   | e <u>E</u> dit Image Layer <u>S</u> elect Fil <u>t</u> er <u>V</u> iew <u>W</u> indow <u>H</u> elp | Custom Proof Condition: Hahn_Baryta   | ОК   | - <del>6</del> ×                        |
| ×                                     | Sample Size: Point Sample  | Proof Conditions  | Reset  |   |
| **                                    |  | Device to Simulate: HFA78-9800BarytaPK.icc -  | <-Default  | → · · · · · · · · · · · · · · · · · · · |
| Ps                                    |  | Preserve RGB Numbers  | ->Default  | Navigator Histogram × Info              |
| ▶⊕                                    |  | Rendering Intent: Relative Colorimetric   |  |   |
| Ξ,                                    |  | ✓ Black Point Compensation  | Preview  | 1 Y                                     |
| ₽.                                    |  | Display Options (On-Screen)   |  |   |
| 1                                     | E. March March March 1 and 1   | Simulate Paper Color  |  |   |
| 4                                     | and the second states  | Simulate Black Ink  |  | A History × Actions                     |
| -                                     |  |   |  | 9 🔊 📷 Alona_Panorama1.tif 🔺             |
|                                       | Store and the state of the state.  | and the state of the | inden para   | Open                                    |
| 1                                     |  | at the second | Address to   | Flatten Image                           |
| · · · · · · · · · · · · · · · · · · · |  |   | 1 × 100 -  | Image Size                              |
| A                                     |  |   | ALL AND L  |   |
|                                       |  |   | and the second s |   |
| ۵.                                    |  |   |  |   |
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| T                                     |  |   | and the second   |   |
| <b>R</b> .                            |  |   | and a second second  |   |
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| Ð,                                    |  |   |  |   |
| Ø                                     |  |   |  |   |
| 3                                     |  |   |  | T                                       |
| Q                                     | 117% 🔞 Doc: 700.8K/700.8K 🕨 4  |   | Þ.   |   |

- Choose appropriate printer profile as Device to Simulate
- Save as Custom Proof Setup if used regularly
- Soft Proof using setup that matches your paper and printer

# Set and View Proof Colours (2)



The difference between a screen image and a proof (printed) image can be substantial

## Setting the View Gamut Warning



Indicates printer's ability to render image colour values

## View Gamut Warning: Paper Surface Effects



Glossy paper gamut warning

Matte paper gamut warning

## Print with Preview... (CS2)



#### Print with Preview...

| Print 🛛 🕹   | J            |
|---|--------------|
| Position       Inches       Image       Print         Iop:       1       inches       Image       Image         Image       Image       Image       Image       Image       Image         Scaled Print Size       Image       Image |              |
| Color Management  | colour<br>nt |
| Options   |              |
|   |              |
| Printer Profile: Pro4800 PGPP   |              |
| Rendering Intent: Relative Colorimetric V Black Point Compensation  |              |

# **Begin With Colour Management**

| Color Management             | ×                                  |                               |                                     |              |
|------------------------------|------------------------------------|-------------------------------|-------------------------------------|--------------|
| Print<br>O Document (Profile | e: ProPhoto RGB)                   |                               | Choose profile t<br>printer & paper | o match your |
| OProo <u>f</u> (Profile      | e: N/A)                            |                               | /                                   |              |
| Options                      |                                    |                               |                                     |              |
| Color Ha <u>n</u> dling:     | Let Photoshop Determine Colors     | ▼ <sup>3</sup> / <sub>2</sub> |                                     |              |
| Printer Profile:             | Pro4000 Premium Luster             | ~                             |                                     |              |
| <u>R</u> endering Intent:    | Perceptual                         | 🖌 🗹 <u>B</u> la               | ck Point Compensation               |              |
| Proof <u>S</u> etup Preset:  | Red River Gloss                    | ~                             |                                     |              |
|                              | 🗌 Simulate Paper Color 💿 🗹 Simulat | te Blac <u>k</u> Inł          | <                                   |              |

#### Use

- 1. Document as source
- Photoshop colour handling 2.
- Profile for your printer / paper combination 3.
- Perceptual/Relative Colorimetric intent and black point 4. compensation

## Then Setup Your Page

| Print  |   |  |  |
|--|---|--|--|
|  | Positic<br>Iop:<br>Left:<br>Scalec<br>Scale:<br>Height:<br>Width:   | 0.494 inches   0.686 inches  Center Image  Print Size  100% Scale to Fit Media  5.119 inches  6.825 inches  Show Bounding Box  Print Selected Area | Print One<br>Reset<br>Remember<br>Page Setup<br>Fewer Option |
| Color Management Print O Document (Profile Proof (Profile)                                 | ProPhoto RGB)   |  | Page Setup   |
| Options<br>Color Handling:<br>Printer Profile:<br>Rendering Intent:<br>Proof Setup Preset: | Let Photoshop Determine Colors<br>Pro4000 Premium Luster<br>Perceptual<br>Red River Gloss<br>Simulate Paper Color | <ul> <li>✓ </li> <li>✓ </li> <li>✓ </li> <li>Ølack Point Compensation</li> <li>✓ </li> <li>ate Black Ink</li> </ul>                                |  |

## Page Setup & Printer Choice

| Page Setup ? 🔀  |  |
|---|--|
| Constructions of the function of the second | Page sizes available may depend on the printer chosen  |
| Image: Section of the section of t                                |  |
| Orientation Margins (millimeters)   |  |
| Portrait     Left: 0 <u>Right:</u> 0  | Page Setup   |
| O Landscape     Iop:     0     Bottom:     0.01   | Printer       Name:     EPSON Stylus Photo 1270       Adobe PDF  |
| OK Cancel Printer   | Type: Epson Stylus Photo 1270<br>Epson Stylus Photo 1270 ESC/P 2<br>EPSON Stylus Pro 4000<br>Where: Family Tree Maker Printer<br>Comment: Microsoft Office Document Image Writer |
| Set orientation to match image  | Network OK Cancel  |

## Positioning & Scaling the Image

| Print                       | rint                          |   |   |   |  |
|-----------------------------|-------------------------------|---|---|---|--|
|                             |                               | Disition<br>Iop: 0.494 inches ✓<br>_eft: 0.686 inches ✓<br>_Center Image<br>Caled Print Size<br>cale: 100% Scale to Fit Media<br>ight: 5.119 inches ✓<br>idth: 6.825 inches ✓ | Print One<br>Reset<br>Remember<br>Page Setup<br>Fewer Options |   |  |
| Color Management            | Color Management              |   |   | the size of the<br>id its location<br>age |  |
| ⊙ <u>D</u> ocument (Profile | e: ProPhoto RGB)              |   |   |   |  |
| Options                     | I at Photoshon Datermine Colo | rs V (1)  |   |   |  |
| Drinsten Draffer            | Dro 4000 Dromium Luster       |   |   |   |  |
| Printer Profile:            | Pro4000 Premium Luster        |   |   |   |  |
| <u>R</u> endering Intent:   | Perceptual                    | Black Point Compensation  |   |   |  |
| Proof <u>S</u> etup Preset; | Red River Gloss               |   |   |   |  |
|                             | Simulate Paper Color S        | imulate Blac <u>k</u> Ink   |   |   |  |

# Positioning & Scaling the Image: Details



## And Now For the Big Kahuna...



## **Setting Printer Properties**

| EPSON Stylus Photo 1270 Properties     EPSON Stylus Photo 1270 Properties     Ad 210 x 297 mm     Media Type     Plain Paper | Printer setting tabs and controls<br>are printer-specific, but all allow a<br>choice of:   |
|--|--|
| Ink<br>© Color © Black<br>Mode<br>© PhotoEnhance<br>© Custom<br>Quality — Speed  | <ol> <li>Paper type</li> <li>Print quality (eschew "Speed")</li> <li>Printer dot pitch</li> <li>Enable / disable printer colour<br/>management (<u>DISABLE</u>)</li> <li>With / without print preview (a<br/>good idea)</li> </ol> |
| Normal<br>Color Controls<br>MicroWeave : On<br>High Speed : On<br>Version 5.20   |  |
| OK Cancel Help   |  |

## Save Time With Custom Print Modes

| EPSON Stylus Photo 1270 Properties       Image: Main     Paper     Layout     Image: Utility       A4 210 x 297 mm     Media Type       Matte Paper - Heavyweight     Image: Matte Paper - Heavyweight | Save custom mode settings for single-command control of:   |
|--|--|
| Ink<br>© Color © Black<br>Mode<br>Mode<br>© PhotoEnfrance<br>© Custom<br>HW Matte Final<br>Advanced  | <ol> <li>Paper type</li> <li>Print quality</li> <li>Printer dot pitch</li> <li>Disabling printer colour<br/>management (<u>DISABLE</u>)</li> <li>Etc.</li> </ol> |
| Photo - 1440dpi<br>No Color Adjustment<br>MicroWeave : On<br>High Speed : On<br>EPSON<br>Version 5.20  | Use a separate custom mode for<br>each paper / print quality / ink<br>combination  |

## The Advanced... Settings Button

| 🞯 EPSON Stylus Pho  | to 1270 Properties 🛛 👔 🔀        |    |         |
|---------------------|---------------------------------|----|---------|
| Main ( a) Paper     |                                 | Us |         |
|                     | Madia Tura                      |    |         |
| A4 210 x 297 mm     | Matte Paper - Heavyweight       |    |         |
|                     | _Ink                            |    | 1.      |
|                     | © <u>C</u> olor ⊂ <u>B</u> lack |    | 2       |
|                     | Mode                            |    | 2.<br>२ |
|                     | C Automatic                     |    | J.<br>⊿ |
|                     | C PhotoEnhance                  |    | 4.      |
|                     | EPSON Custom                    |    | _       |
|                     | HW Matte Final                  |    | 5.      |
| V V                 | Advanced                        |    |         |
|                     |                                 |    |         |
| Photo - 1440dpi     |                                 |    |         |
| No Color Adjustment | Black - Color -                 |    |         |
| High Speed : On     |                                 |    |         |
|                     |                                 |    |         |
| EPSON               | ✓ Print Preview                 |    |         |
| Version 5.20        |                                 |    |         |
|                     | OK Cancel Help                  |    |         |

Jse the Advanced... button to specify and save for future use:

- 1. Paper type
- 2. Print quality
- 3. Printer dot pitch
- Disabling printer colour management (<u>DISABLE</u>)
- 5. Etc.

## Sample Advanced Printer Settings



## At Last, Click OK...

| 🥩 EPSON Stylus PI  | noto 1270 Properties 🔹 👔 🔀                        |   |
|--|---|---|
| 🚱 Main 🍙 Pape  | r 🌝 Layout 🙀 Utility                              |   |
| A4 210 x 297 mm  | – Media <u>T</u> ype<br>Matte Paper - Heavyweight |   |
|  | Ink<br>© Color © Black                            |   |
|  |   |   |
|  | EPSON Custom                                      |   |
| Photo - 1440dpi<br>No Color Adjustment<br>MicroWeave : On<br>High Speed : On | Black   |   |
| EPSON<br>Version 5.20  | ✓ Print Preview                                   | Use the Preview button to ensu correct size and orientation |
|  | OK Cancel Help                                    |   |

#### ...Check Your Print Preview...





## ...and Click Print

