Considering Color in Archival Digital Images of Works of Art

Julie Goforth
Johns Hopkins University
MARAC 2016
jgoforth16@gmail.com
The Milkmaid, Johannes Vermeer, c. 1660, Rijksmuseum.
A Definitive Image

• A color record of the work at a certain point in time can be used as a benchmark for future comparison, conservation & restoration

• Most scholarly image possible
Collaboration for Color Results
The Imaging Process

• An Object
• An Observer (human or camera)
• A Light Source (color temperature and type of bulb is widely variable)

[Diagram showing a light source and an observer, with a spectrum of colors and temperature ranges: Infrared, Embers, Candle, Incandescent, Tungsten Halogen, Household Fluorescent, Noon Sunlight, Monitors, Shade, Skylight, Ultraviolet, temperature values from 800°K to 12,000,000°K]
Determining the Color Temperature

• A collaboration of experts:
  – Art Historians
  – Conservationists
  – Imaging Specialists
  – Photographers

<table>
<thead>
<tr>
<th>Setting/Location</th>
<th>Example</th>
<th>Illuminant Type</th>
<th>Color Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Church</td>
<td>Byzantine icon</td>
<td>Candlelight</td>
<td>1800-2000K</td>
</tr>
<tr>
<td>Northern lit studio or plein air works</td>
<td>Vermeer, Monet</td>
<td>Daylight</td>
<td>5000-10000K Refer to geo-location</td>
</tr>
<tr>
<td>Artist preference</td>
<td>Rothko</td>
<td>‘Low light’</td>
<td>unknown</td>
</tr>
</tbody>
</table>

Sample Color Temperature Chart
Two Separate Images

• High quality imaging is expensive & time consuming
• Will most likely not be made often
• Current standards of illumination will continue to be used so images will be suitable for all purposes
• Impractical to recreate different lighting scenarios during image capture
Spectral Imaging

- Does not depend on light source
- Expensive
- Lack of software and expertise to manage images
- Great amount of data generated
- Unfeasible for common use
RIT Spectral Images with Different Illuminants Applied

Original Image
D20 / 2000K / Candlelight
D50 / 5003K / Daylight
D120 / 12,000K / Bright Daylight, Hazy

Considering Color in Archival Digital Images of Works of Art

MARAC 2016 Annapolis
Julie Goforth
Color Temperature Differences Based on Type of Illuminant

- Works known to have been created or meant to be displayed under illumination other than daylight such as candlelight, electric or torch light.
- Candlelight temperature is in the low end of the spectrum – around 2000K
- Warmer tones

Byzantine 13th Century, Enthroned Madonna and Child c. 1250/1275, National Gallery of Art
Color Temperature Differences Based on Geographic Location

- Color temperature varies according to Geographic location.
- Many artists use a studio illuminated by northern light.

Vermeer, Johannes, Dutch, 1632 - 1675
Woman Holding a Balance c. 1664, National Gallery of Art
Digital Curators

- Keep image and documentation together
- Accessible
- Regular data checks
- Format migrations
- Secure storage
Conclusion

• The standard color temperature does not treat individual works individually.
• The Archival or preservation digital image should not be constrained by use or preference but should be an objective and scholarly representation of the work.
• Collaboration between knowledgeable experts is needed to determine the most likely color temperature for each work and to create the image.
• All of the factors used to create the image should be saved with the image as it goes into the long-term preservation life-cycle.

The Art of Painting, Vermeer, c. 1662 – 1668, Kunsthistorisches Museum, Vienna