

PROJECT SUMMARY: Our project explored the topic of color and brightness in art and the visual system using art from the Nasher Museum's collection. We analyzed how color and luminance are treated in art and processed in the brain, using a combination of image processing analyses and spectrophotometric studies to illustrate that color is perceptual, rather than physical. The project culminated with an ongoing exhibit and a symposium at the Nasher Museum of Art, titled "Seeing Color: Art, Vision & the Brain."

PROJECT OBJECTIVES

- Explore how our neural mechanisms affect our perception of art.
- Curate an exhibition at the Nasher Museum of Art on color and the brain.
- Organize a symposium with leading experts across the disciplines.

METHODOLOGY

- Qualitative approaches: Analysis, discussion, and thorough examination of artworks from the Nasher.
- Quantitative approaches: Measuring the spectral output with a spectroradiometer and using digital image processing techniques to isolate areas of interest in particular works.

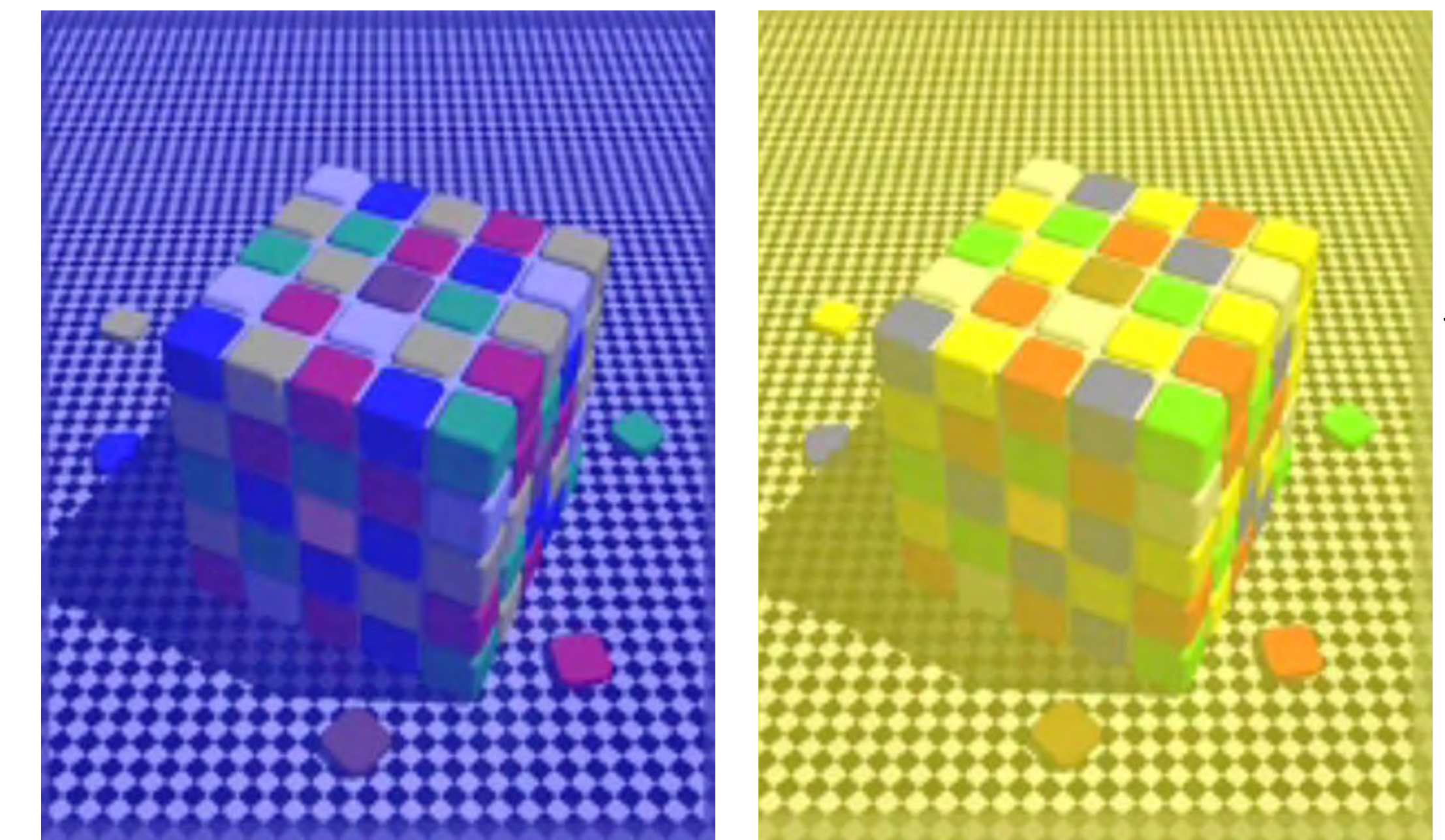
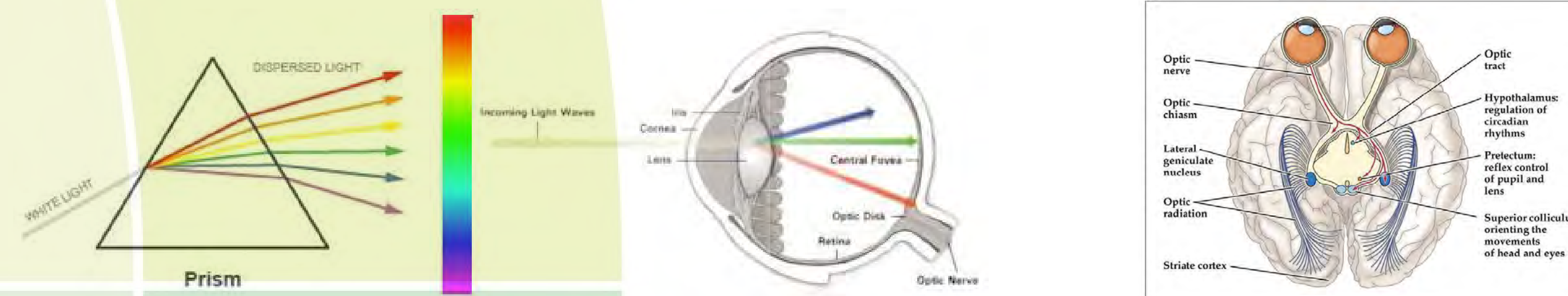


SUMMARY

- Color is truly an interdisciplinary study, where empirical work created by artists helps spark scientific inquiries, and modern color theory can help guide artists.
- Published exhibition catalogue describing the art techniques and neuroscience principles to complement the Seeing Color symposium (held April 13, 2015) and exhibition (displayed in the Nasher Academic Focus Gallery through July 5, 2015).

WHAT IS COLOR?

- In the late 17th century, Isaac Newton determined that visible light is composed of many different wavelengths that could be resolved into the component colors red, orange, yellow, green, blue, indigo, and violet.
- However, scientists and artists realized that even the same spectral composition of light can be perceived differently. Color is a perceptual phenomenon created by the eye and brain.



Color illusions by R. Beau Lotto and Dale Purves

Illusions are useful as a research tool because they tell us how the brain works, that the brain evolved NOT to see the retinal image...but to see the world in a way that proved useful in the past - R. Beau Lotto

AN EXPLORATION IN COLOR PHENOMENA



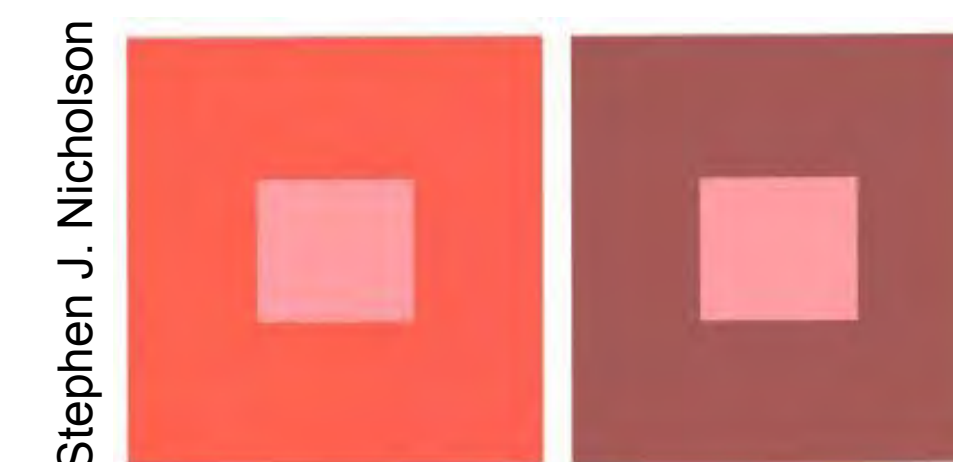
Two Visions of Scriabin by Alexander Golovin, 1900-1910

Learning to Look: What happens when you view this painting through a blue filter?



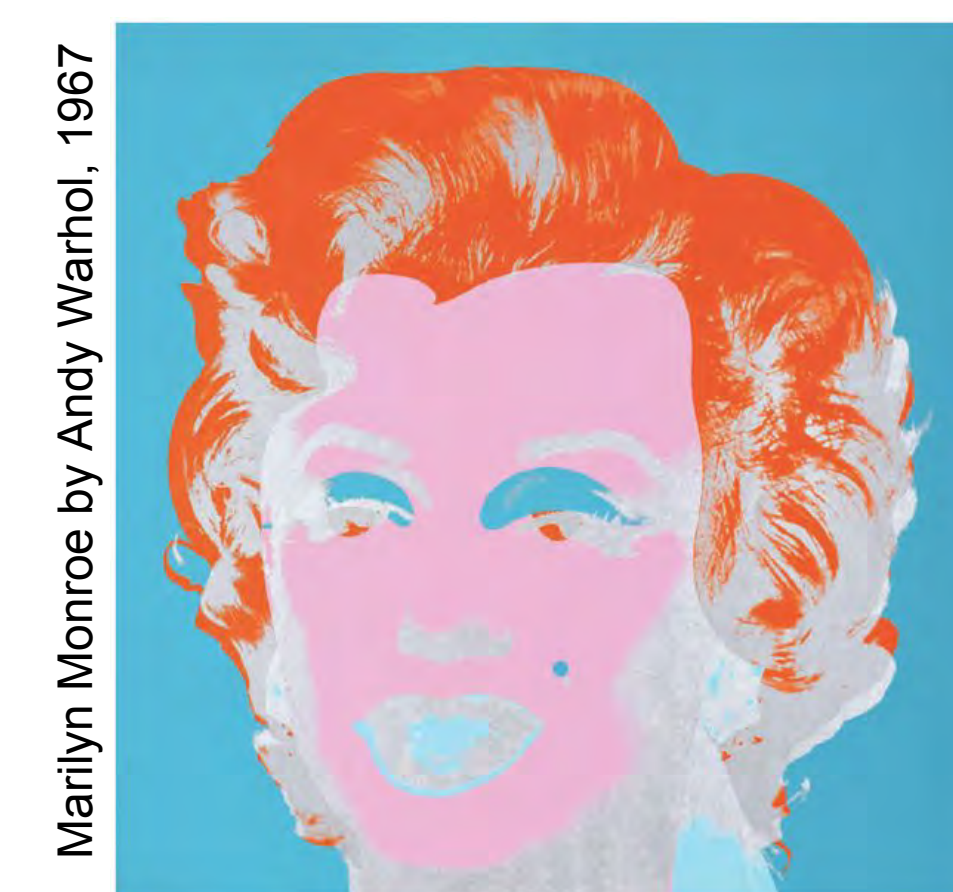
Untitled by Ilya Mashkov, 1920

Optical Mixing
 When two colors, painted side-by-side, are viewed from a distance, the visual system blends the colors together. Up close, our receptive fields are able to discern the two dots independently, so the effect disappears.



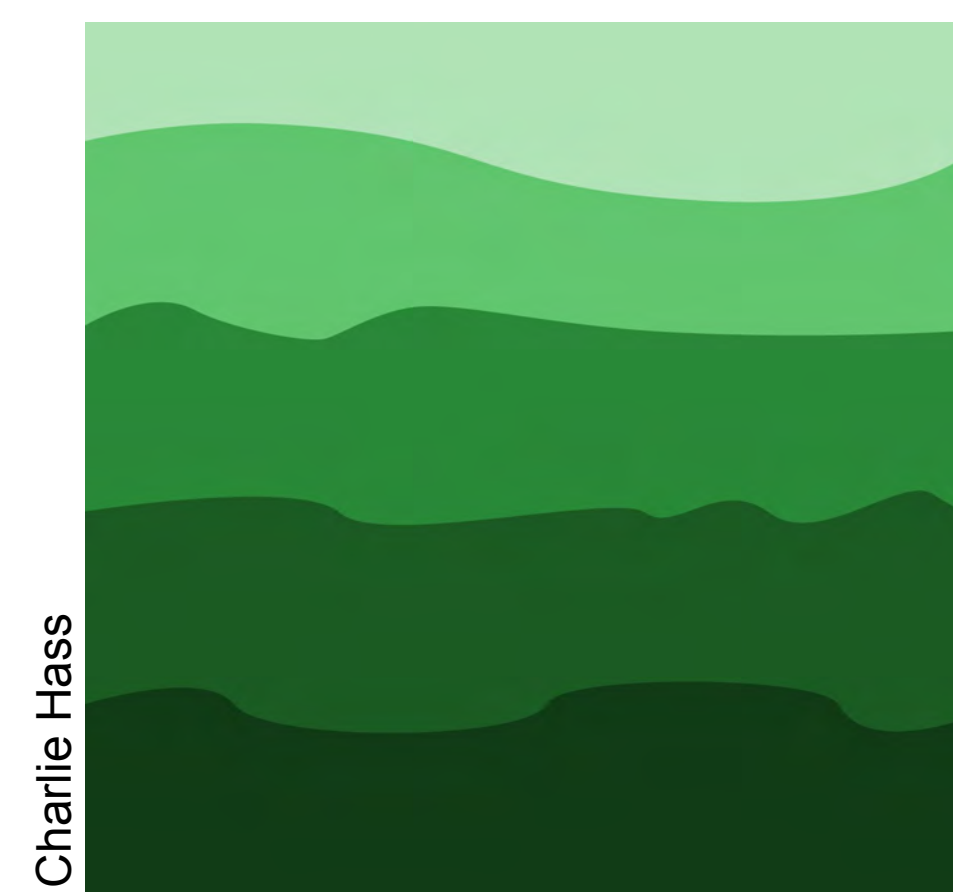
Stephen J. Nicholson

Color Induction
 The tendency of a color to shift in appearance due to the surrounding chromatic context.



Marilyn Monroe by Andy Warhol, 1967

Luminance
 The brain uses luminance (or brightness) in addition to color cues to process information. In the absence of luminance differences (i.e. equiluminance), the brain has difficulty seeing depth and discerning objects. Artists take advantage of equiluminance to create vibrating illusions.



Charlie Hass

Chevreul Effect
 When colors of the same hue but different intensities are placed side-by-side, the visual system perceives a gradual lightening and darkening along the boundaries of the two colors. Edges play an important role in color perception.

