## On behalf of Vision Expo, we sincerely thank you for being with us this year.

**Vision Expo Has Gone Green!**

We have eliminated all paper session evaluation forms. Please be sure to complete your electronic session evaluations online when you login to request your CE Letter for each course you attended! Your feedback is important to us as our Education Planning Committee considers content and speakers for future meetings to provide you with the best education possible.

vision expo

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## Financial Disclosure

Michael Gatti is an employee of HOYA Vision Care.

All relevant relationship have been mitigated.

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## How We Visualize Our Reality

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## Course Objectives

- Create a clear understanding of light
- Explain the complete visual system
- Utilize optical illusions to demonstrate how we see

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## Light

**Light is energy**

- Photons
  - Smallest piece of light
  - Discrete packet of energy
  - Energy is proportion to the frequency

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## Light

**Light is extremely complex**

- Is it a wave?
- Is it a particle?

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## Light

**Particle or wave?**

- Photons
  - Fixed energy
  - Fixed momentum
  - Fixed location in space
- Particle > Wave
- Wave > Particle

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## Light

**Double Slit Experiment**

- Importance of observation
- Wave pattern
- Particle pattern

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## The Visual System

Do we see with
our eyes **or** our brain?

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## The Visual System

- Sight begins with light.
- Visible light is ROYGBIV.
- Reflected light provides visual cues.

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## The Visual System

**DIOPTER**
[DI-OP-TER]

A unit of measurement of the refractive power of lenses equal to the reciprocal of the focal length in meters.

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## The Visual System

**Myopia = Nearsightedness**

- Focal length too short
- Image lands in front of retina

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## The Visual System

- Steeper curve
- Too much power

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## The Visual System

**Hyperopia = Farsightedness**

- Focal length too long
- Image lands behind retina

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## The Visual System

- Flatter curve
- Not enough power

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## The Visual System

Astigmatism

- Two different focal lengths
- More than one image forms

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## The Visual System

Astigmatism

- Misshapen curve
- Two different powers

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## The Visual System

Fovea

- The most valuable square millimeter of tissue in the body
- Responsible for 20/20 vision

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## The Visual System

Optic Nerve –

- The information highway.

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## The Visual System

**Color is Light**

- How we see color
- Ishihara Test
- Colorblind

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## The Visual System

**Farnsworth Test**

- Photoreceptors
- 100 unique shades
- 1 out of 12 men
- 1 out of 255 women

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## The Visual System

**Poor Little Kitty Cat**

- Vertical & Horizontal blinders
- Strobe light's create motion blindness

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## Illusions

**We create what we see**

- Literal optical illusion
- Physiological optical illusion
- Cognitive optical illusion
  - Binocualarity

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## Illusions

**Vision & Memory**

- What do you see?
- Black & white animal
- Lives on a farm
- Renshaw Cow

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## Illusions

**We Create What We See**

- Brain conditioning
- Which is darker?

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## Illusions

**The black and blue dress**

- What color do you see?
- Inside or outside?

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## Summary

**We Visualize Our Reality**

- Light acts as both a wave and a particle
- Light gets focused to the back of the eye
- We see with our brain, not with our eyes

Squaring the Circle - Troika

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