Light / Vision / Space

A TALK ON PHOTOGRAPHY, LIGHTING AND SPACE BY RUSSELL ABRAHAM & KRISTEN PAULIN
Lighting allows us to see the world.
Lighting allows us to see the world
Shows us the way and brings beauty into our lives.
Lighting allows us to reach for the heavens.
And see architecture as it has not been seen before.
And have some fun!
Seeing a space with your eyes and photographing it are different . . .

. . . in some very important ways.
Our eyes are wonderful tools.
The human eye is far superior to any digital or film camera in a number of ways:

So why do photos rarely look as good as how you see the spaces in-person? Because human vision is much more advanced.

As photographers, we’re constantly bridging that gap. Our job is to recreate what the eye and brain sees.

Let me dig into the details a little bit:

The human eye is far superior to any digital or film camera in a number of ways:

- We don’t have to change lenses
- Our brain automatically adjusts exposure
- Our brain automatically adjusts for color. Photographers need to do that in post production.
The human eye is far superior to any digital or film camera in a number of ways:

$2^{20} = 1,048,578$ shades

$2^{14} = 16,384$ shades

$2^8 = 256$ shades

$2^4 = 32$ shades

Human observation can recognize 16-20 stops of light

Most digital cameras can capture 10-14 stops of light

Monitors can only display 8 stops of light

Printers and inks can only record 4 stops of light

www.despines.com/2016/05/31/too-many-stops
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The human eye has a lot more “pixels” than your camera or your retina-screen-phone or laptop. (about 130 million pixels). We know them as rods and cones. Cones make-up about only 6% of the total, and the rest are all “Rods”, which see black and white.

Within the eye is an area called the Macula, which provides our ‘central vision’, and within the Macula, there’s this little dip called the “Fovea”. That’s where the majority of our color-sensing cones are – All densely packed together. So the central part of our visual field has far more resolving ability than even the best camera.

The part of the retina outside of the Macula has fewer ‘pixels’;” the black-and-white-sensing “Rods”. That’s our peripheral vision.

So how do our eyes and brain deal with these varying photoreceptors??

Here is a simulation of how the eye and brain create an image. Notice how the edges are soft focus, muted colors, and only the center is sharp. What your eye does is capture a rapid sequence of images, which the brain seamlessly assembles in a fraction of a second.
How human vision works...
Eye + Brain = Foveal Vision

This is what your brain perceives. It's a compilation of the detailed vision within the Fovea, therefore named "Foveal Vision". What then, does the camera see?
What the camera sees...

Something like this... inky shadows. Muddy details.
What the camera sees... with fill-lighting.

As photographers, this is our attempt to recreate foveal vision. How do we do it? Well, sometimes we blend exposures, also known as HDR. But Russell and I prefer to use additional fill-lighting as our main technique.

By adding lighting to the space...

- We can fill shadows
- Balance for the light outside
- Render colors accurately
- Better define most of the objects and textures in the room
- Recreate the image that our minds have just stitched together
Color Accuracy
Rendering accurate color is a challenge.
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80 CRI MR16 LED

95 CRI MR16 LED
LED Source comparisons: Philips vs. Soraa
LED Source comparisons: Philips vs. Soraa

95 CRI

80 CRI
LED Source comparisons: 80 vs. 95 CRI
How do we render accurate color in Photography?

- We work with benchmarks, like gray cards and color charts.
- We use fill lighting that has a known color temperature and match that to the existing ambient lighting.
- We will shift the color temperature of our lighting when necessary to match the lighting in the space.
- We have post production tools that can read and adjust image color by matching benchmark.
- We have special editing tools that can work on specific problem areas in an image.
- Finally, there is an art to all of this and each photographer has his own style and palette.
LED Retrofit Projects
The Hotel Healdsburg retrofit
Marin County Residence retrofit
Kwan Henmi Architects
Kwan Henmi Architects
Lighting Design: Paul Helms Design Consultants
535 Mission St, San Francisco
The Austin, San Francisco
The Austin, San Francisco
Balancing inside and outside light

Interiors: Edmonds + Lee Architects
Balancing inside and outside light

Interiors: Edmonds + Lee Architects
Interiors: Edmonds + Lee Architects
Mixing light sources with broad color ranges
Working with existing lighting
Stag’s Leap Wine Cellars, Napa
Architecture: Javier Barba
W Hotel, San Francisco
Residential Lighting
Residence, Carmel Valley
Architect: Dan Fletcher
Landscape: Arterra
Residence, Los Gatos
Interior Design and Lighting: RKI Interiors
Starchitects
Desert House: Will Bruder, F.A.I.A.
Desert House: Will Bruder, F.A.I.A.
Adding just a drop of fill light
Pelican Point House: Eric Miller, F.A.I.A.
Amara House: Robert Swatt, F.A.I.A.
Lighting Design: Kim Cladas
Amara House: Robert Swatt, F.A.I.A.
Lighting Design: Kim Cladas
Amara House: Robert Swatt, F.A.I.A.
Lighting Design: Kim Cladas
BEFORE
Digital Imaging
100 Congress, Austin, TX

Lighting Scheme: Paul Helms Design Consultants
BEFORE
Summit Hotel, Cincinnati, OH

Lighting Scheme: Paul Helms Design Consultants
Hong Kong Convention and Exhibition Centre

Lighting Scheme: Paul Helms Design Consultants