LIGHTFAIR International 2019

Provider Number - Z136

Understanding Light Through Pictures: Visualizing Innovations in Daylight Modeling ***(EXCERPT - DANIEL & MATTHEW'S SECTIONS)***

Course Number: L19SM01

Daniel Glaser, LightStanza
Kevin Van Den Wymelenberg, University of Oregon
Matthew Tanteri, HLB Lighting

May 21, 2019, 2PM

Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

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Course Description

Learn about cutting-edge techniques in daylight modeling which provide designers with renderings/animations that help communicate the quality of light to clients and daylight strategies that would otherwise be technically challenging to visualize.

Learning Objectives

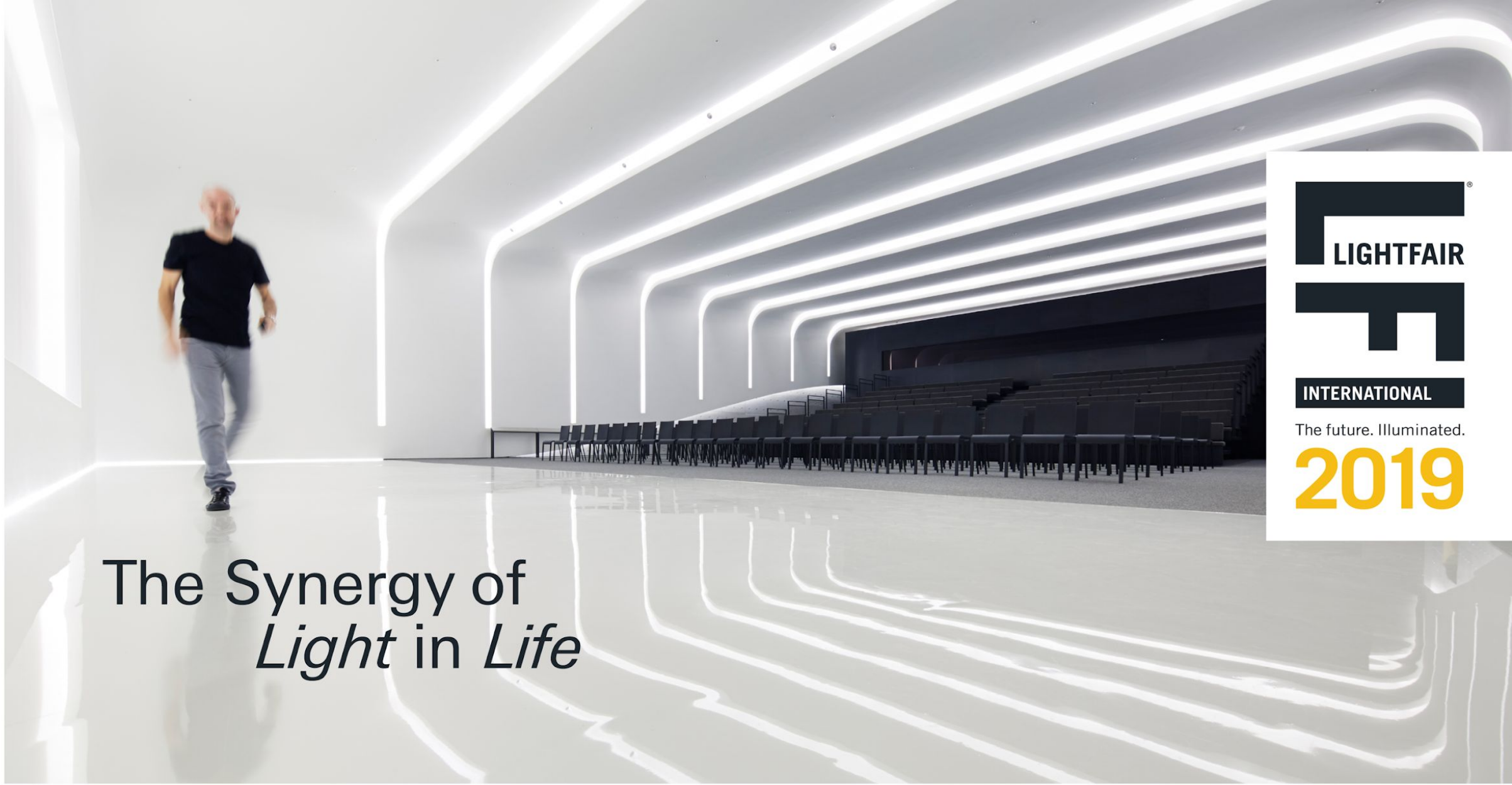
At the end of the this course, participants will be able to:

1. Learn how Big Data can create intuitive representations of daylight to help inform the electric light layout of a space

2. Learn how “manual” daylighting and solar analysis tools are used as part of an overall visually based methodology to guide the concept design process and design development

3. Understand the ROI of daylight modeling and how it can address human & wellness factors such as visual quality and entrainment of circadian rhythms

4. Understand how to apply innovative daylight strategies, such as dynamic glass, daylight redirecting film and dynamic blinds, with electrical lighting for a more holistic and healthy design



The Synergy of *Light* in *Life*

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INTERNATIONAL

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30 / CELEBRATING 30 YEARS OF LIGHTING INNOVATION

LIGHTFAIR® International
LIGHTFAIR.COM

Philadelphia, PA USA
Pennsylvania Convention Center

Trade Show & Conference
May 19–23, 2019

Photography by Nacása & Partners

IALD IMC

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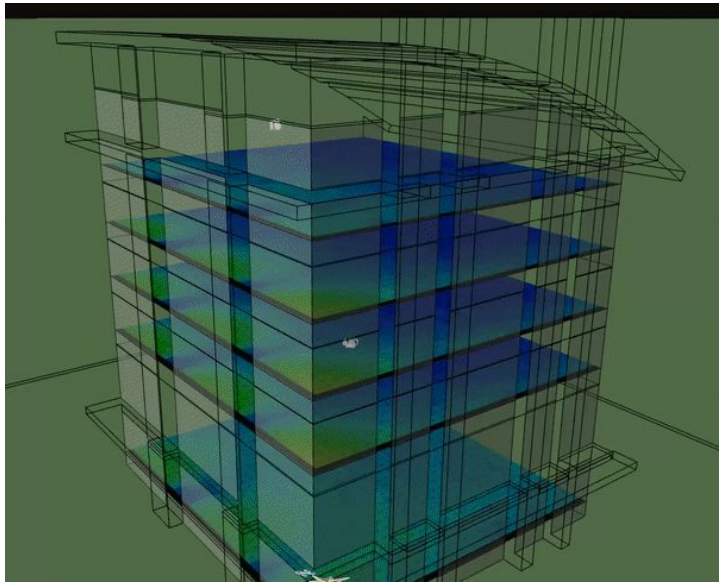
Big Data and Daylighting Analysis

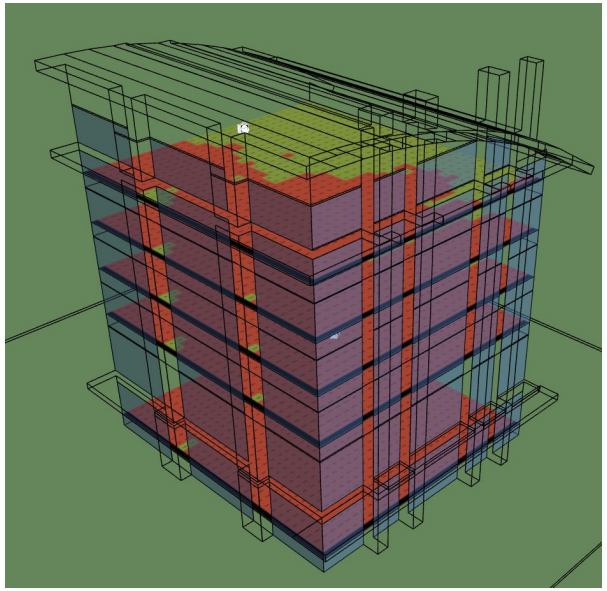
Daniel Glaser, PhD | Founder, LightStanza

Big Dimensions of Daylight

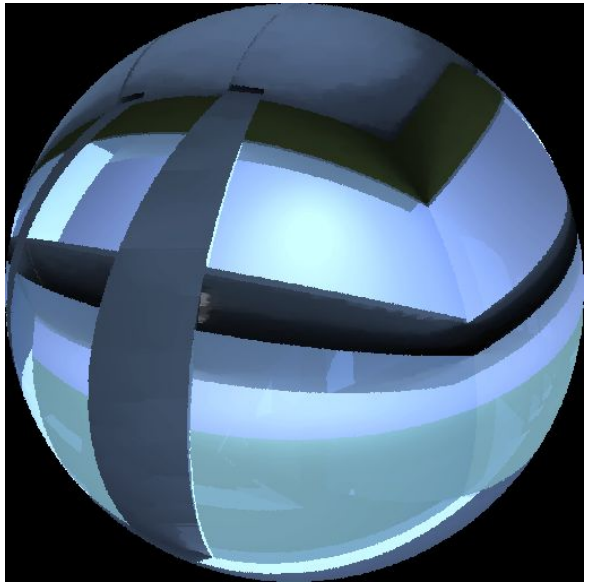
Spatial



Temporal *



Human-Centric



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A Big Data Example

Ft. Collins Administration Building, Stantec
USGBC Mountain West Green Building of the Year (2018)

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Human Dimension: Glare

12pm: DGP=32%

Glare Type	DGP Range
Imperceptible	0 - 35%
Perceptible	35 - 40%
Disturbing	40 - 45%
Intolerable	45%+

Location Changes Experience

12pm: DGP=41%

Glare Type	DGP Range
Imperceptible	0 - 35%
Perceptible	35 - 40%
Disturbing	40 - 45%
Intolerable	45%+

Occupants Change Experience

	Glare Type	DGP Range
	Imperceptible	0 - 35%
	Perceptible	35 - 40%
	Disturbing	40 - 45%
	Intolerable	45%+

12pm: DGP=19%

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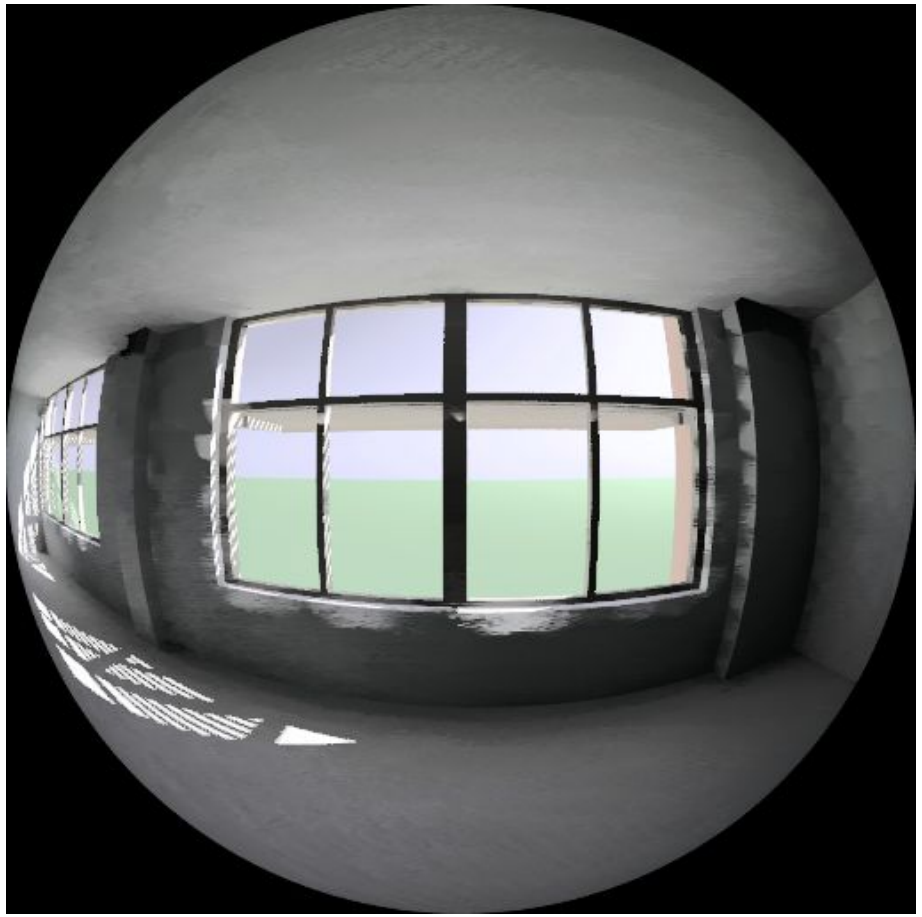
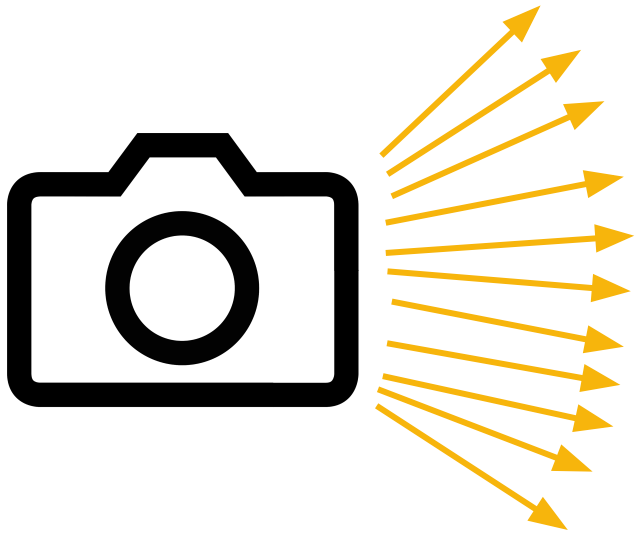
Time Changes Experience



	Glare Type	DGP Range
	Imperceptible	0 - 35%
	Perceptible	35 - 40%
	Disturbing	40 - 45%
	Intolerable	45%+

3pm: DGP=28%

How to Simulate for a Single Location?

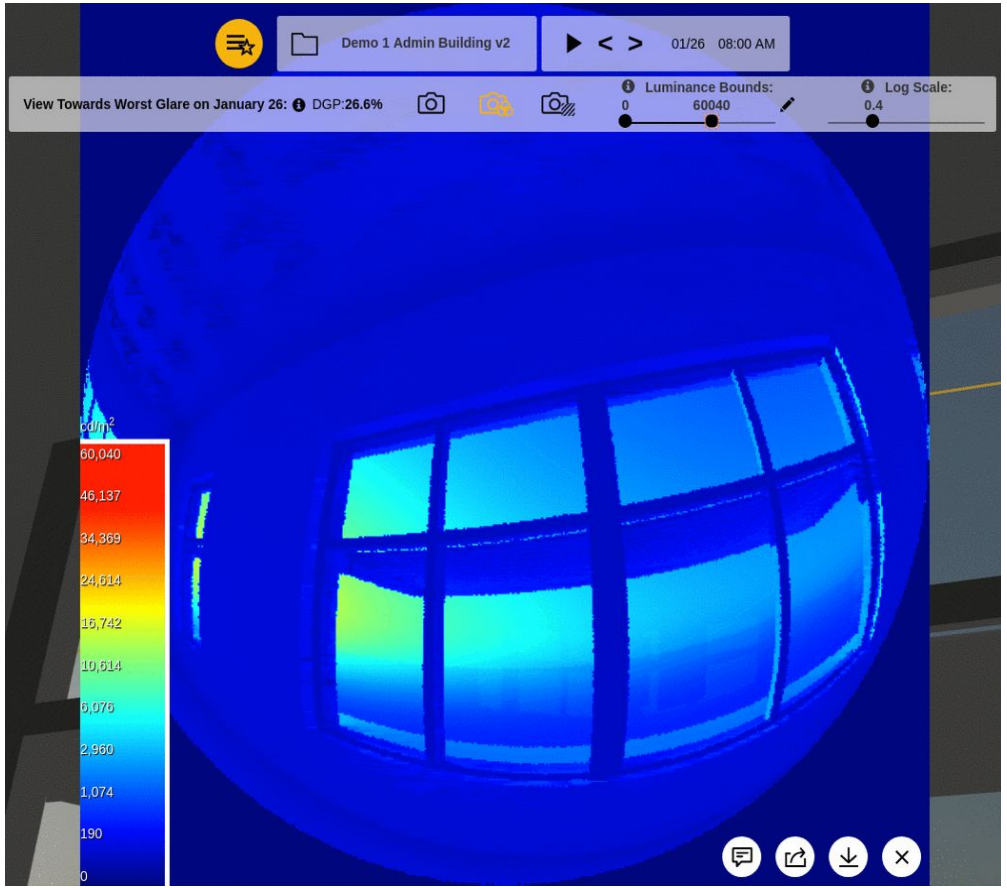


For every hour of the year at your location/climate, look in 26 directions:

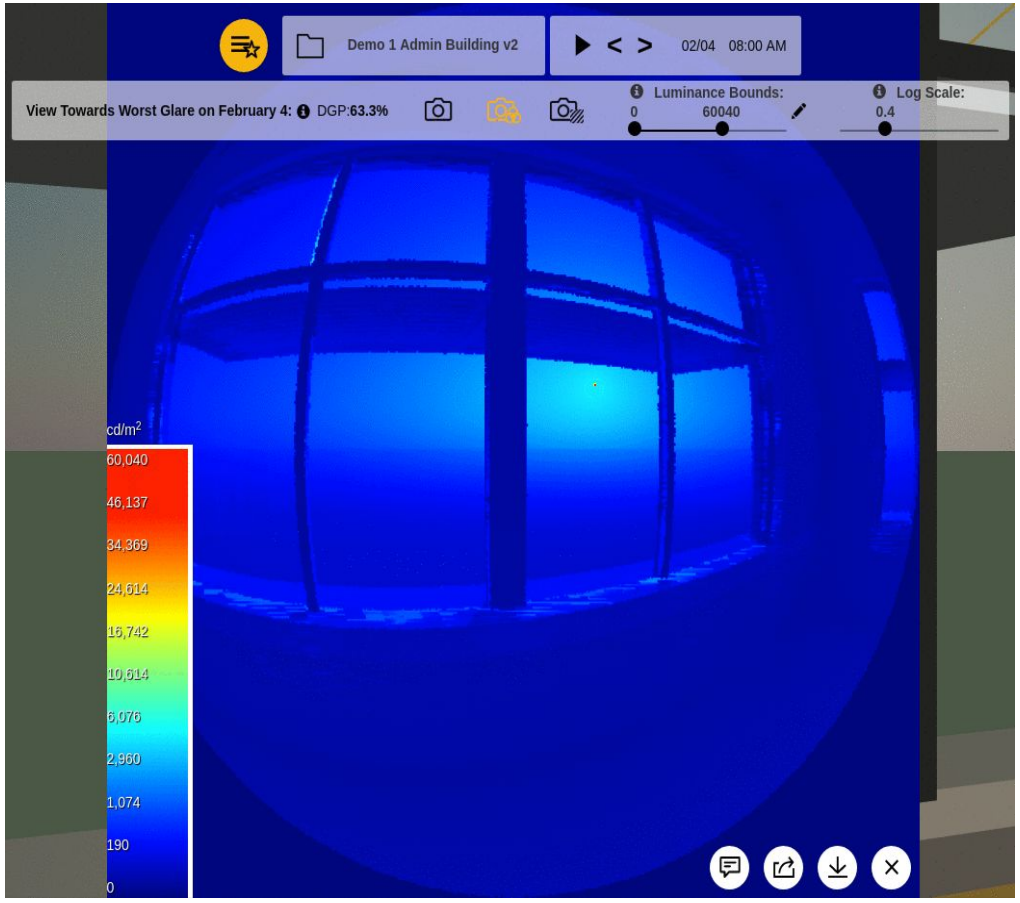
- Take a photograph
- Compute Daylight Glare Probability (DGP) for each direction
- Average DGP for the 26 directions

26 * 4000 = ~100,000 glare calculations per location checked!

Glare at “Worst Location”



Mitigating Glare: Dynamic Glass



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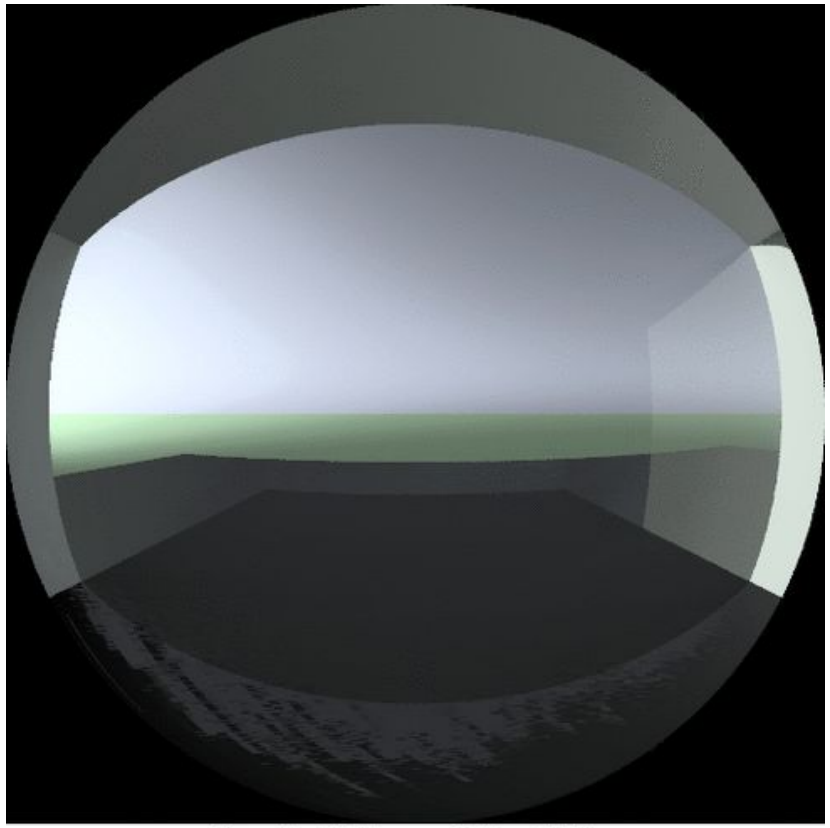
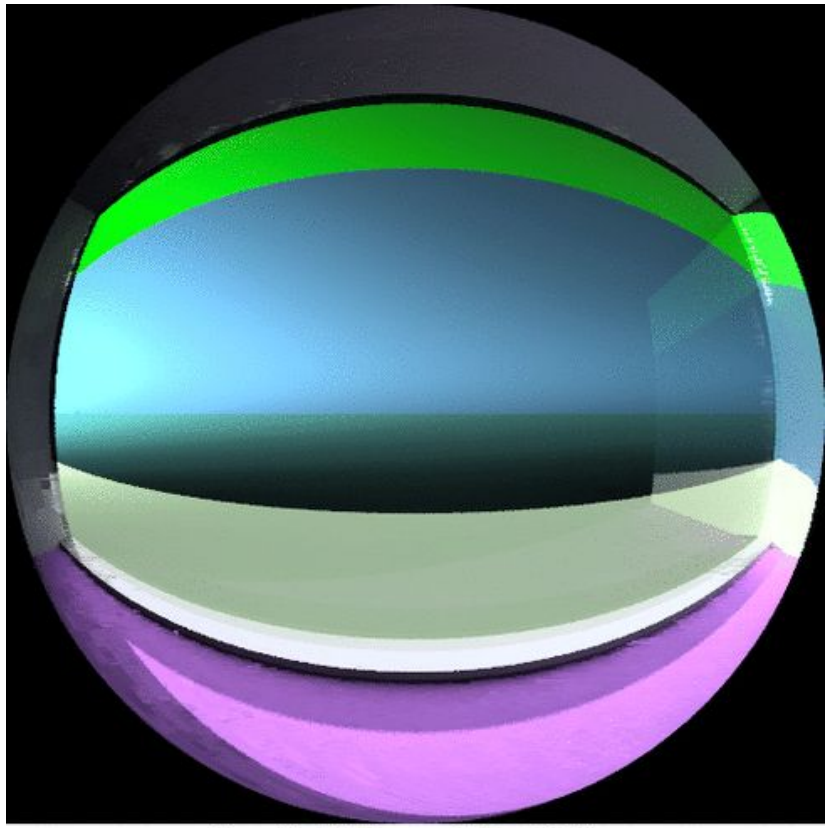
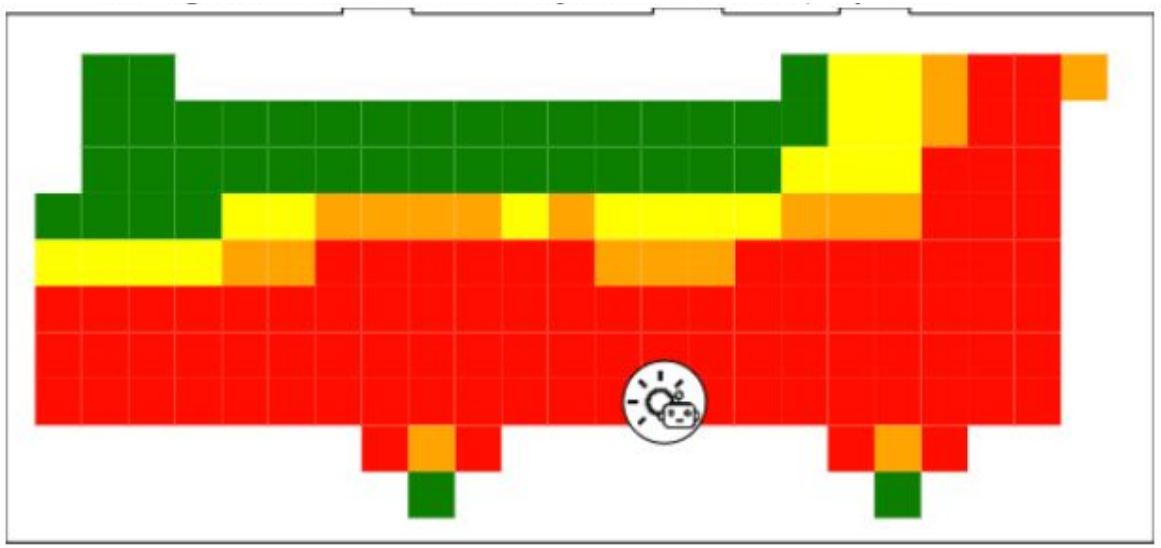
Another Human Dimension: Color Rendering





How to Simulate an Entire Building

N



Glare Type	DGP Range
Imperceptible	0 - 35%
Perceptible	35 - 40%
Disturbing	40 - 45%
Intolerable	45%+

Checking 300 spots = 30 Million Glare Calculations!

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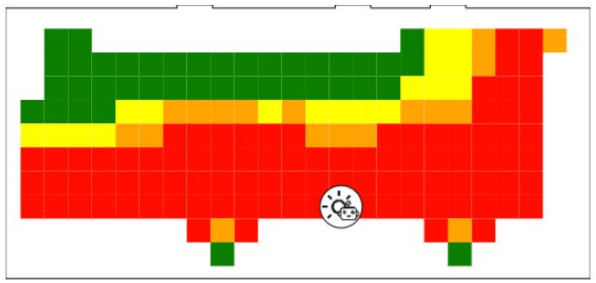
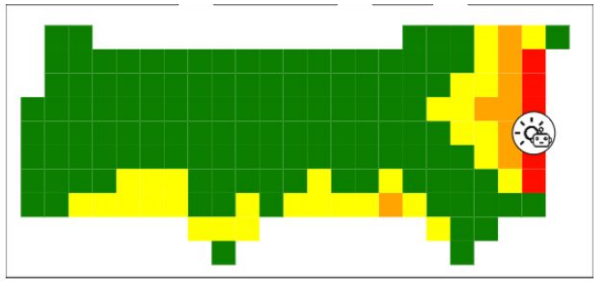
Quickly Simulate Alternatives

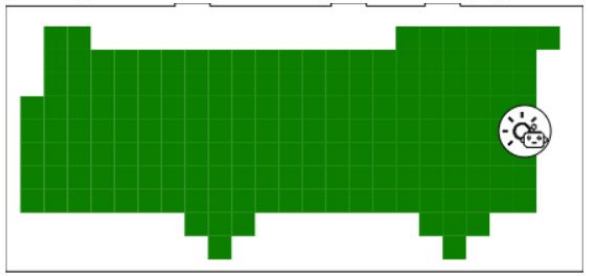
N



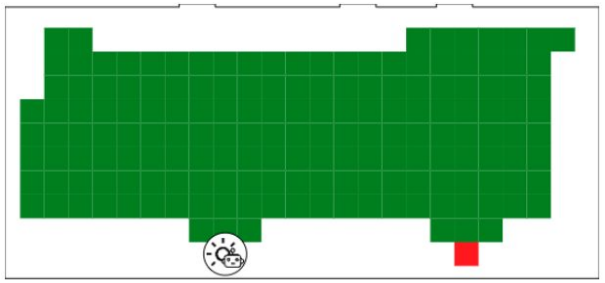
Overhang only



Overhang and Redirect film



Dynamic Glass



Automated Shades

Glare Type

- Imperceptible
- Perceptible
- Disturbing
- Intolerable

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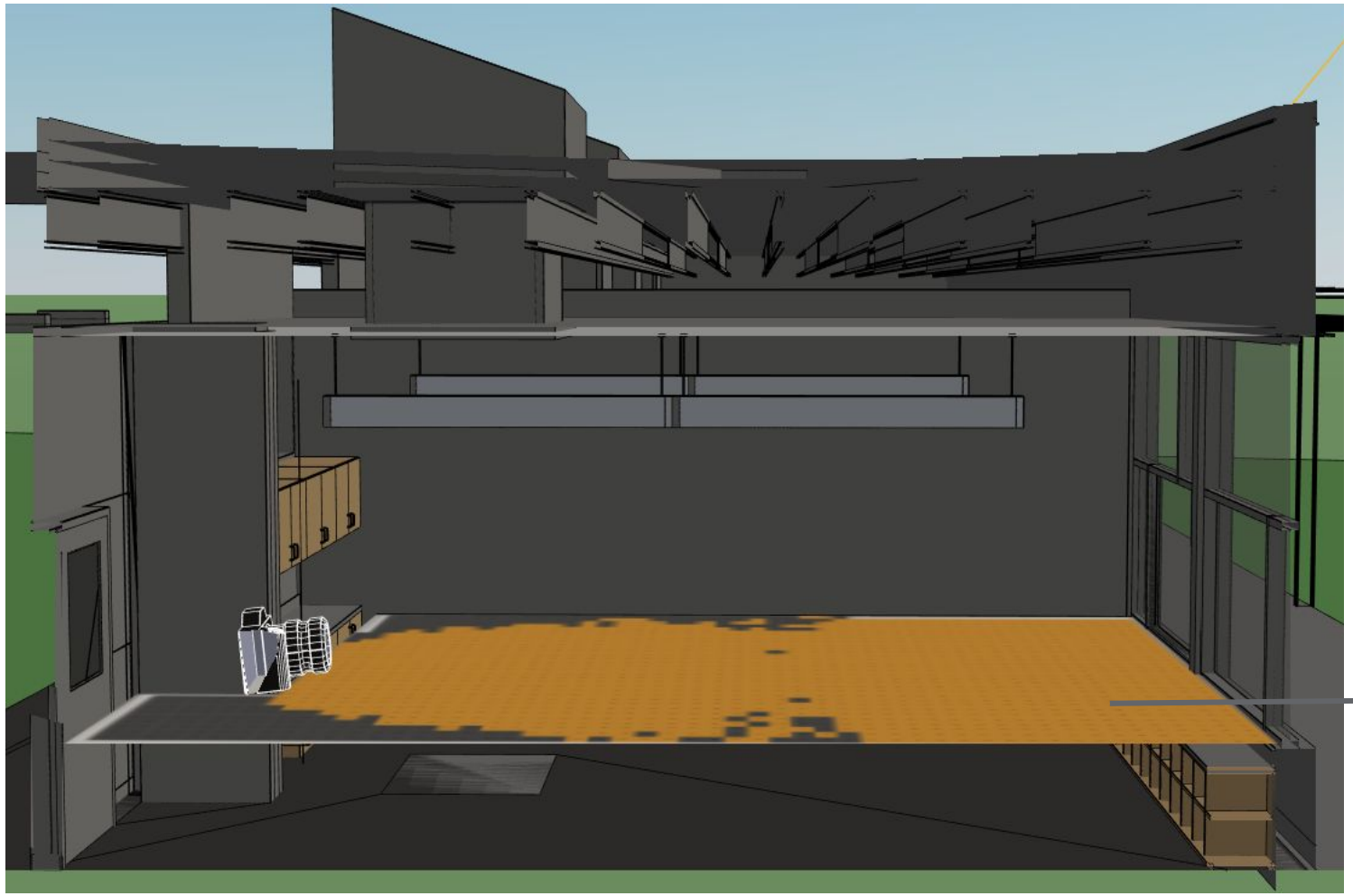
Classroom Facade Design

ASPEN COMMUNITY SCHOOL, WOODY CREEK, COLORADO, CUNINGHAM GROUP

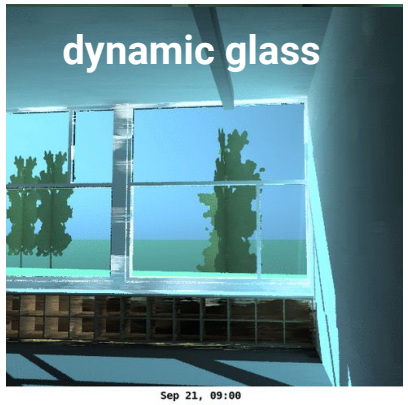
Annual Metrics

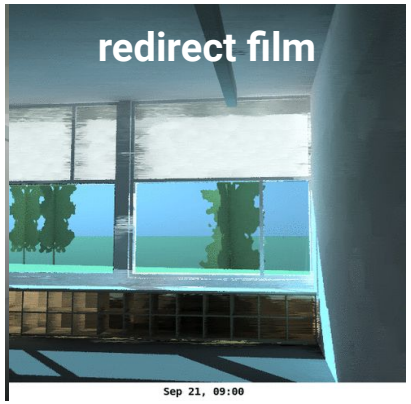


Do we have sufficient light in the space?

≥300 lux
≥50% of the time

≥300 lux
<50% of the time





How to Analyze Options in Detail

Annual Metrics for Different Options

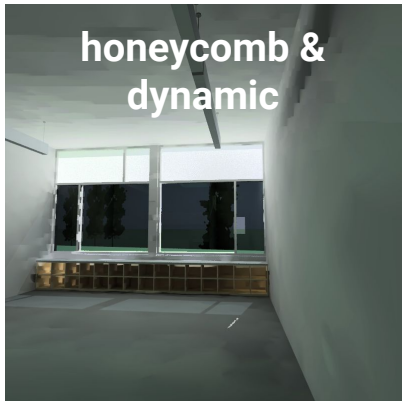
AVG=2147 lux
DA=93%
ASE=50%
GLARE=56%

AVG=2145 lux
DA=91%
ASE=14%
GLARE=14%

AVG=2156 lux
DA=73%
ASE=25%
GLARE=0%

AVG=2557 lux
DA=93%
ASE=27%
GLARE=41%

AVG=3079 lux
DA=94%
ASE=27%
GLARE=62%



AVG=2430 lux
DA=90%
ASE=17%
GLARE=30%

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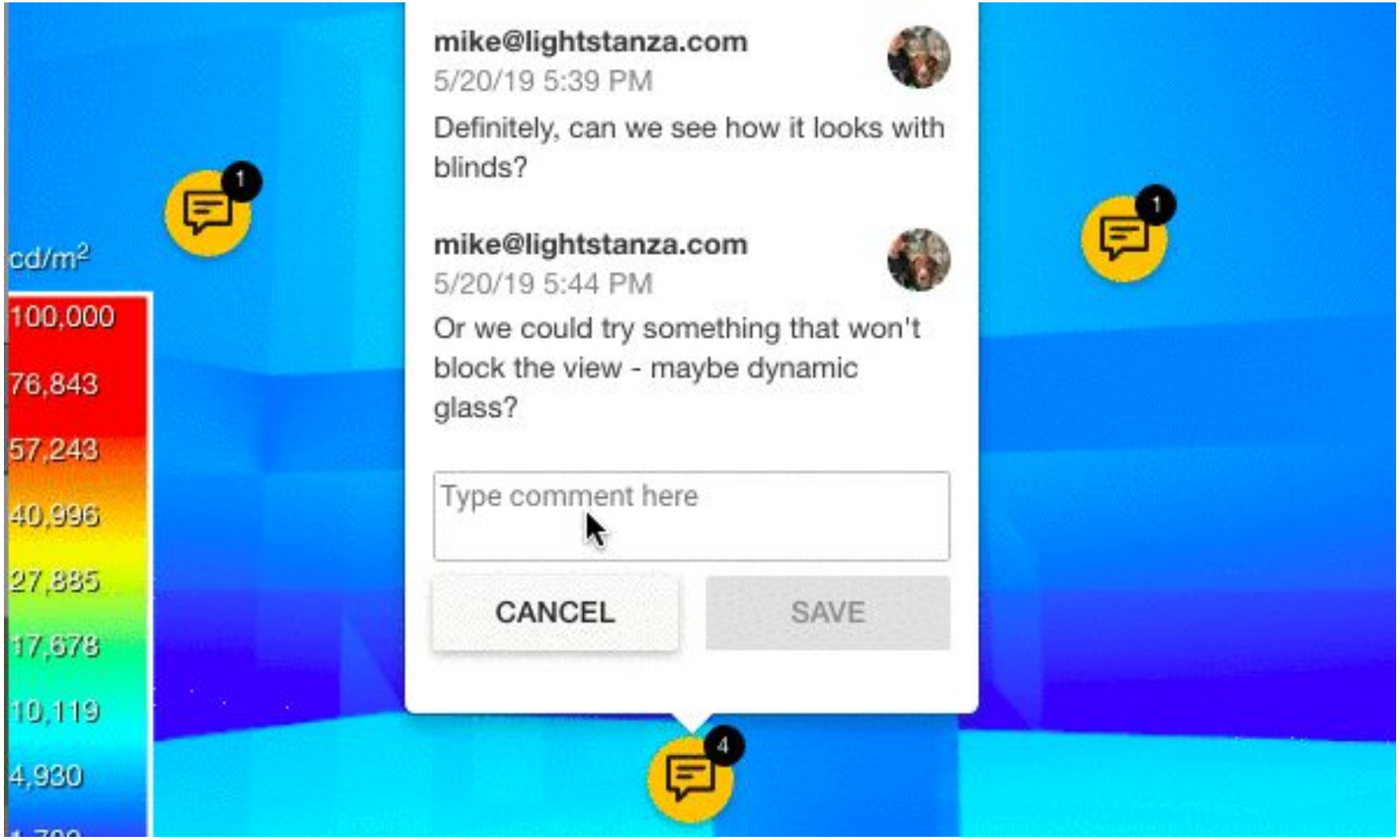
Teams Can Collaborate Together



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Manual Daylighting Tools

The Evolution of Visual Methodologies in Daylighting Design

Matthew Tanteri | FIES, IALD, CPHC, Associate Principal, Daylighting and Sustainable Design Studio Leader, HLB LIGHTING DESIGN

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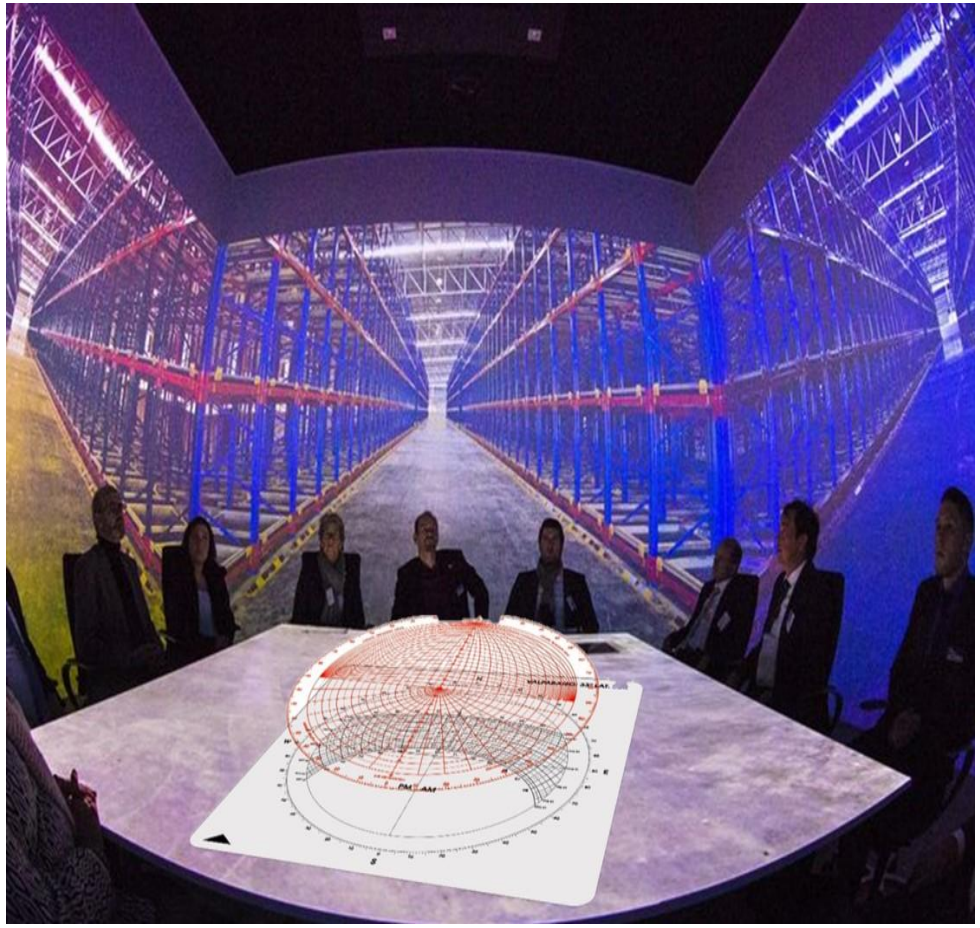


Learning Objectives

01

Uncover the vast array of ‘manual’ daylighting design tools

02

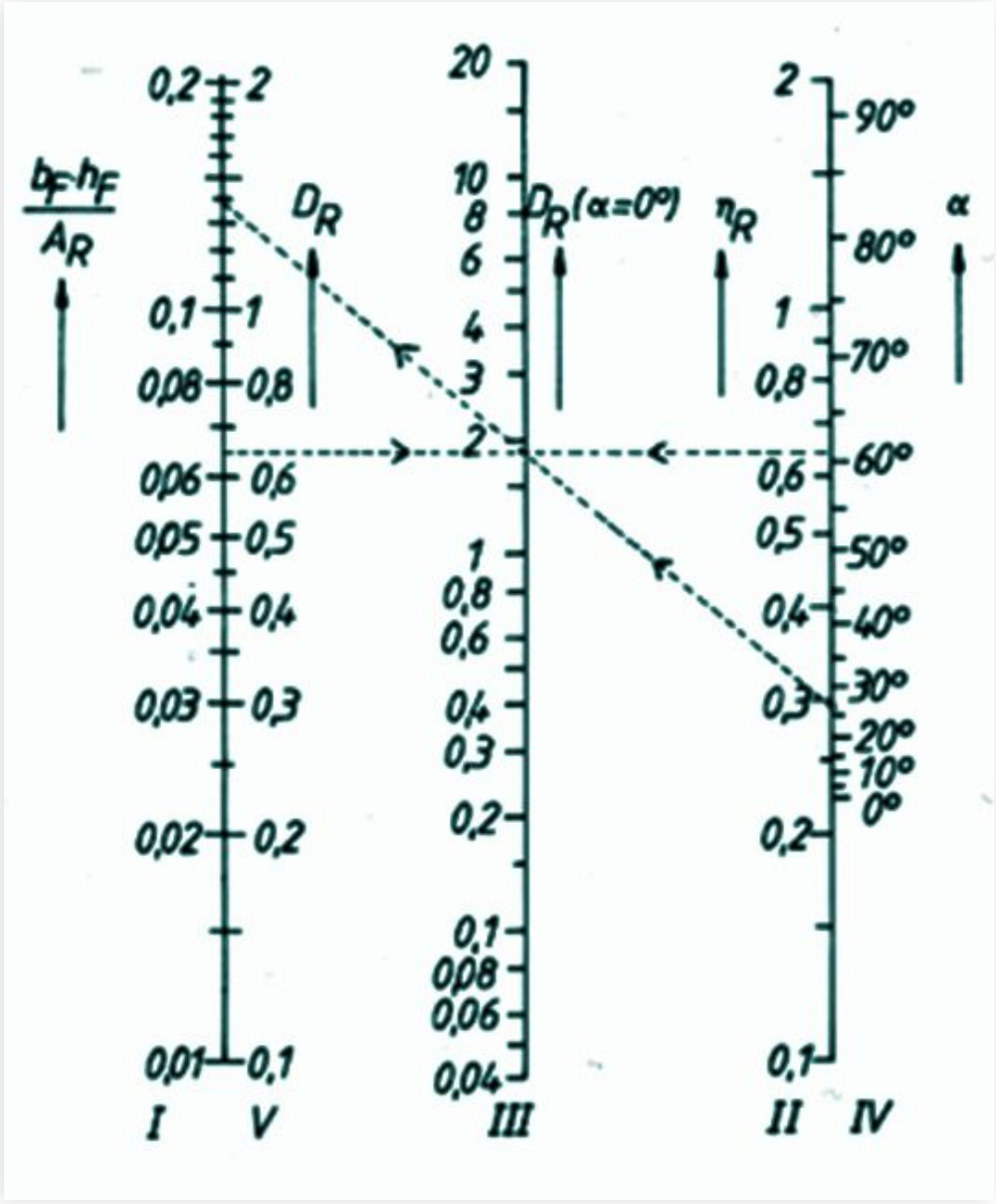
Remind us that what came before is as brilliant as what is to come

03

Learn how “manual” tools fit into current day digital visually-based simulation methodologies

01 Manual Tools

- IRC Nomogram



Source: IRC Nomogram, IEA SHC Task 21/ECBCS Annex 29, Survey Simple Design Tools

01 Manual Tools

01 Manual Tools

- Heliodon

Photo: Derek Porter

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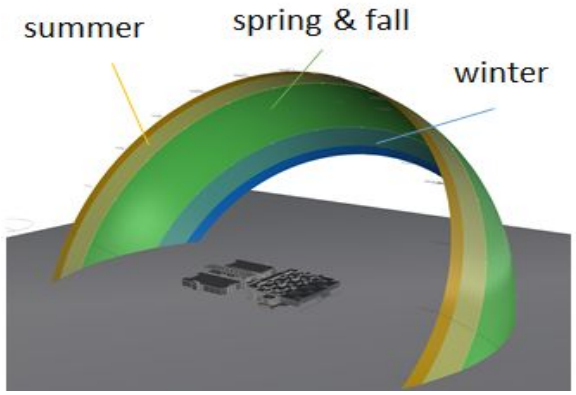
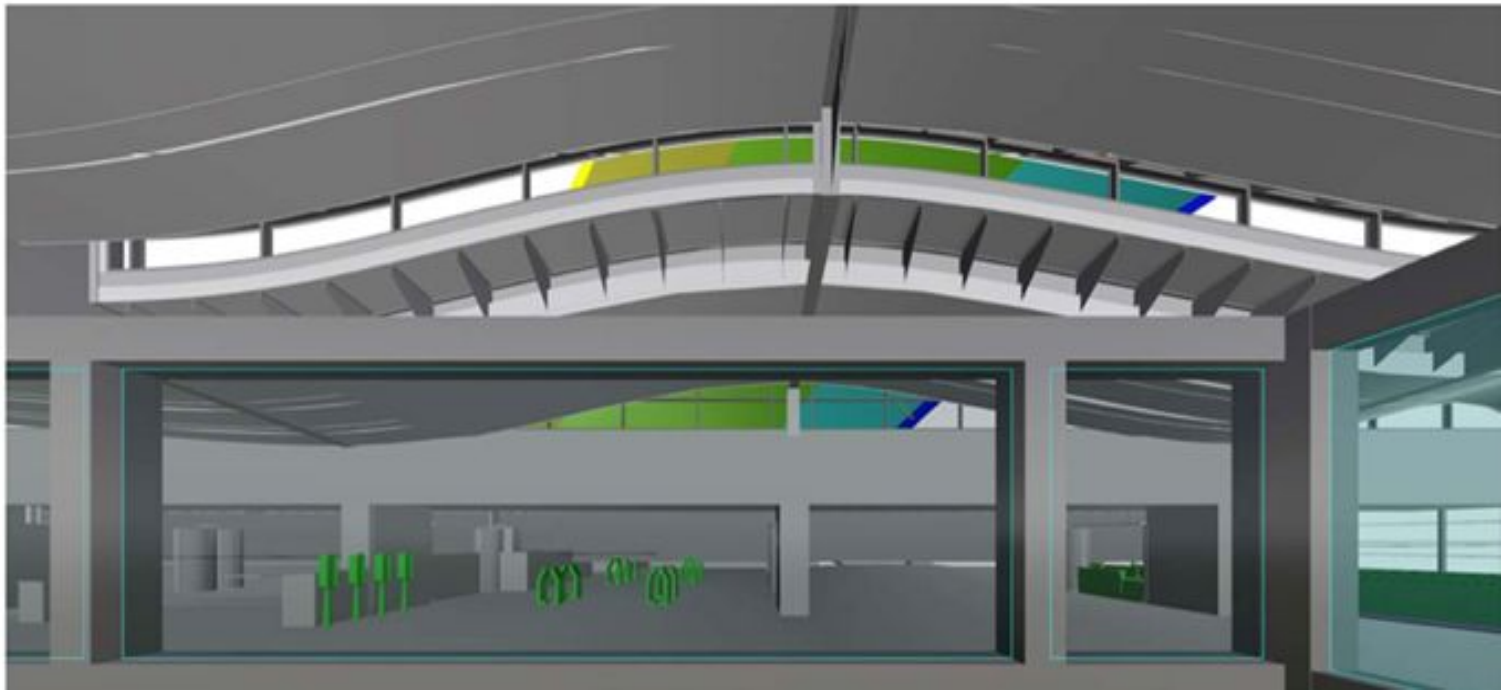
01 Manual Tools

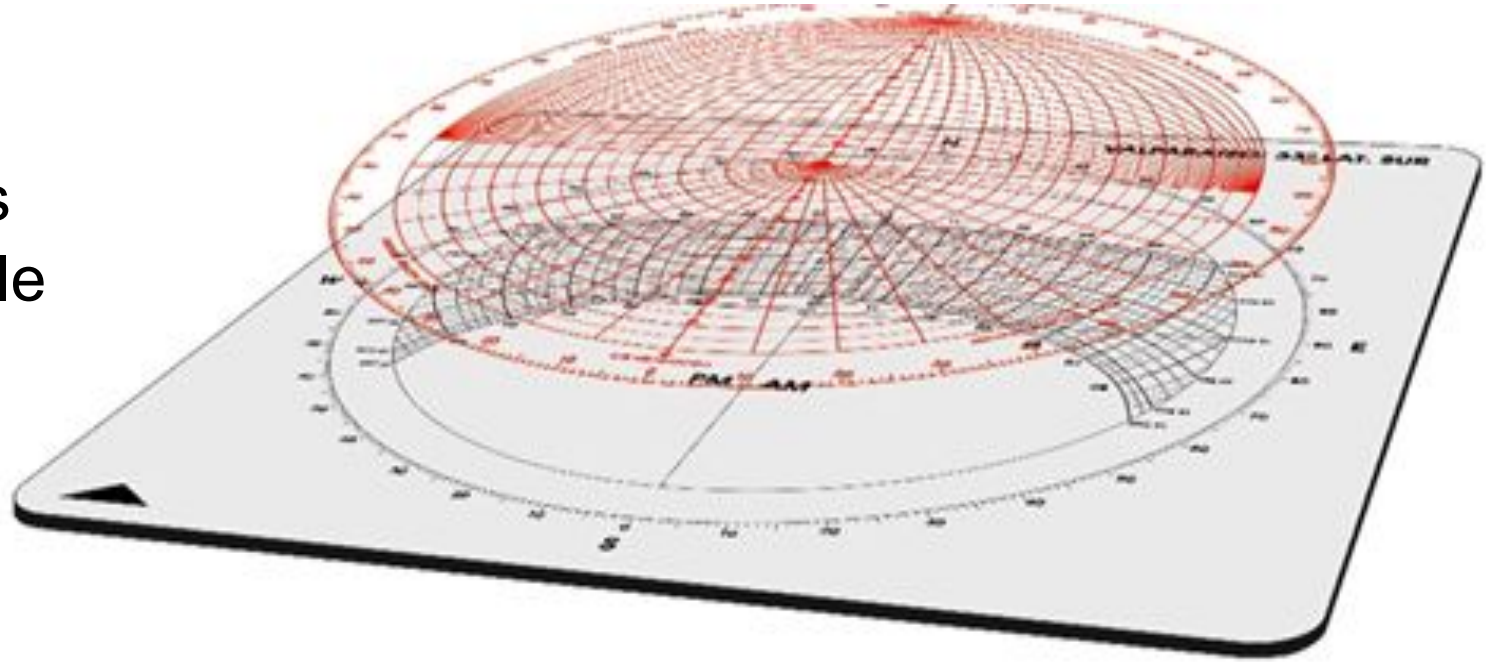


- Simulated Physical Modeling

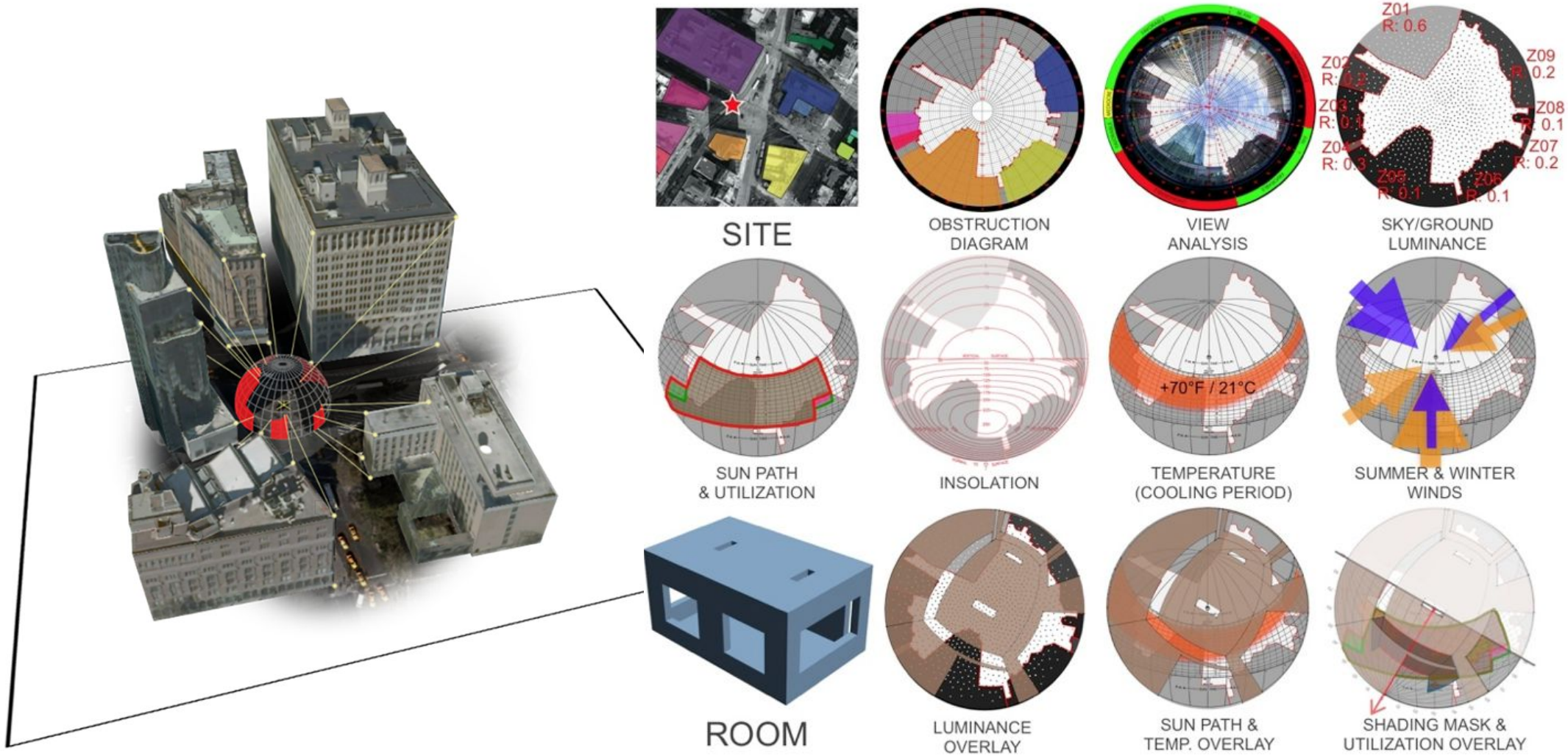


01 Manual Tools

- Libbey Owens Ford Sun Angle Calculator (1974)



02 Methodologies



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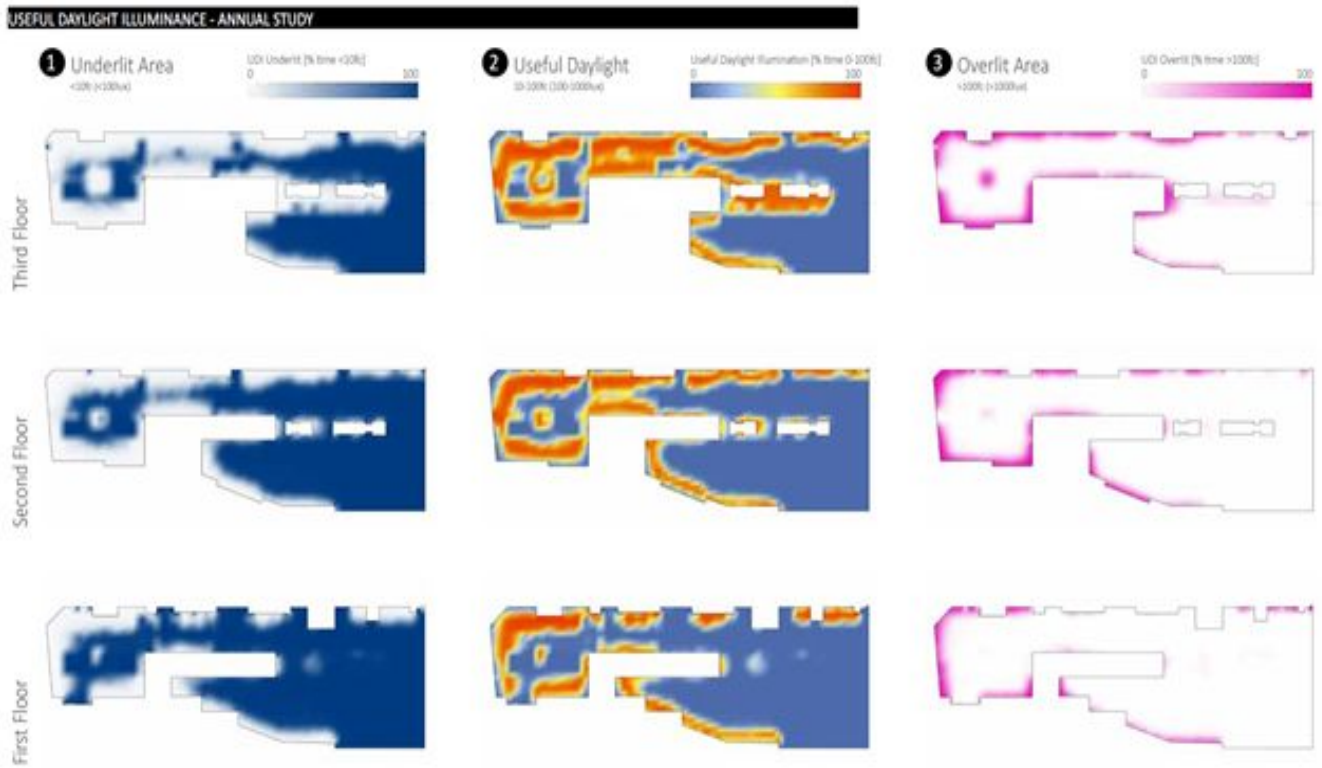
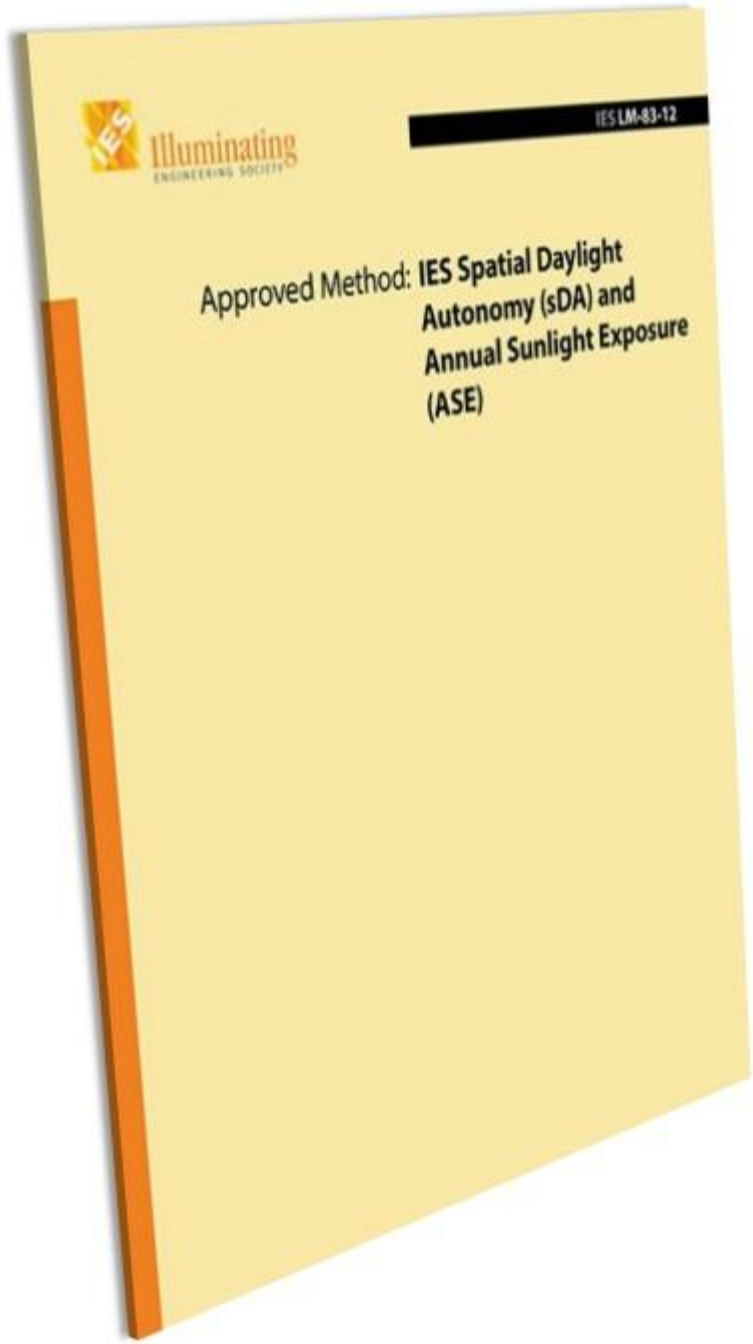
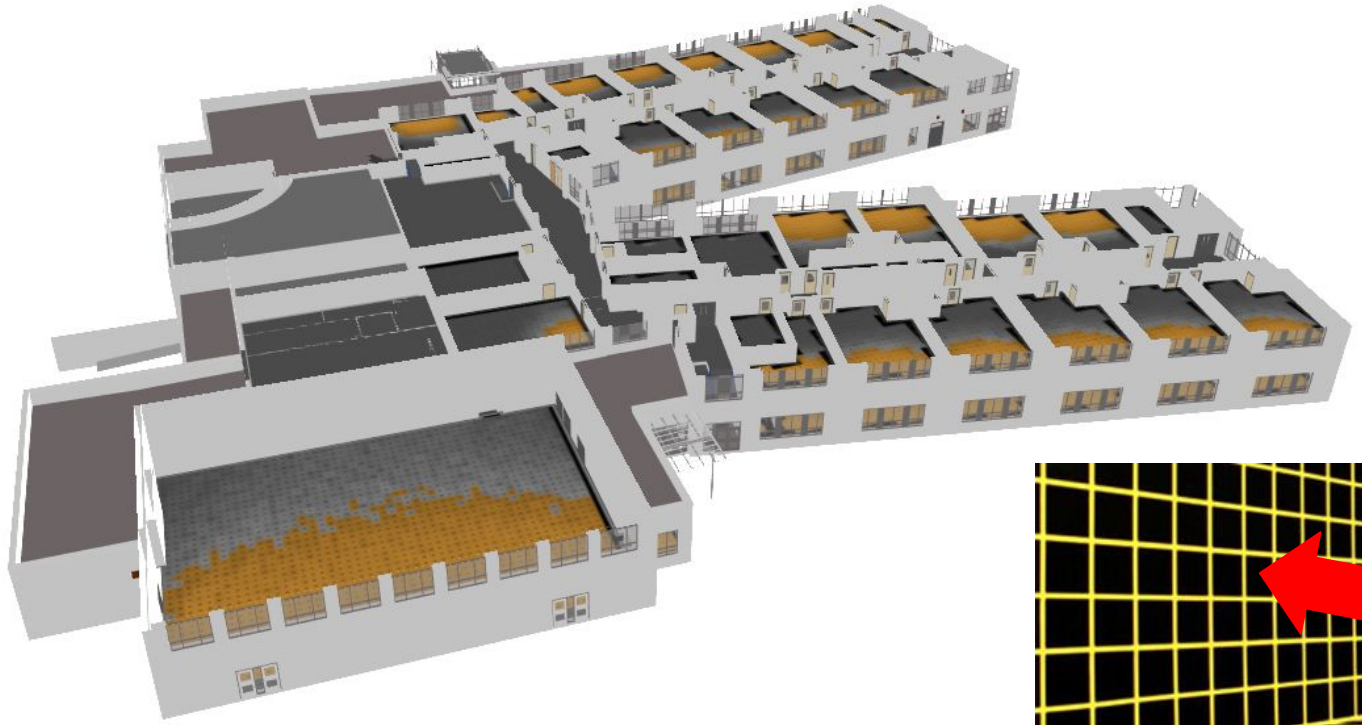
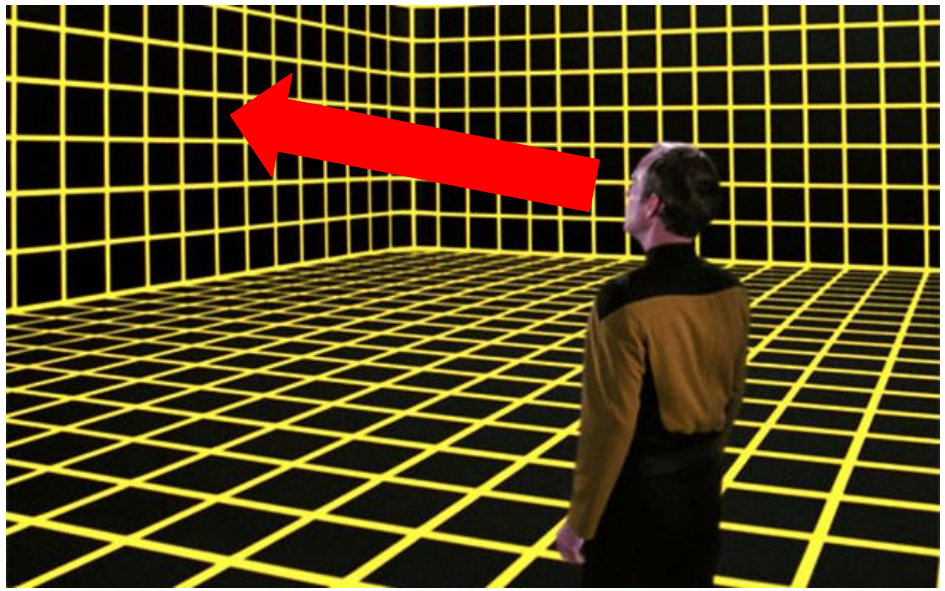
02 Methodologies



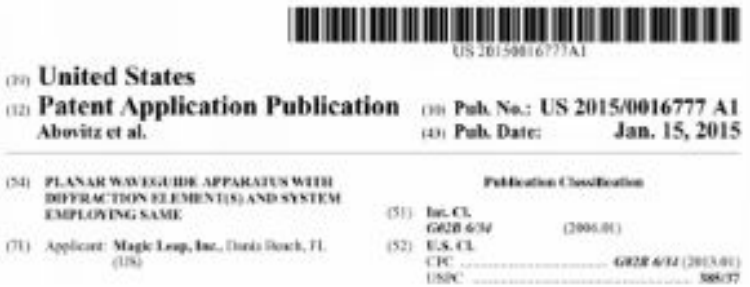


03 Immersion





03 Immersion



US 20150016777A1

(19) United States

(12) Patent Application Publication

Abovitz et al.

(10) Pub. No.: US 2015/0016777 A1

(43) Pub. Date: Jan. 15, 2015

(54) PLANAR WAVEGUIDE APPARATUS WITH DIFFRACTION ELEMENT(S) AND SYSTEM EMPLOYING SAME

(71) Applicant: Magic Leap, Inc., Dania Beach, FL (US)

Publication Classification

(51) Int. Cl.
G02B 6/34 (2006.01)

(52) U.S. Cl.
CPC G02B 6/34 (2013.01)
USPC 385/37

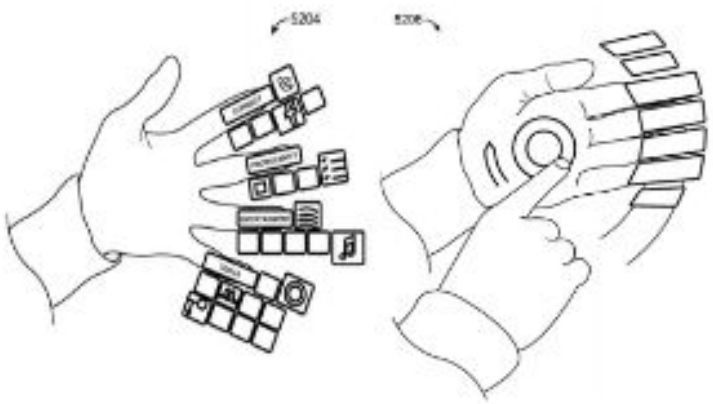
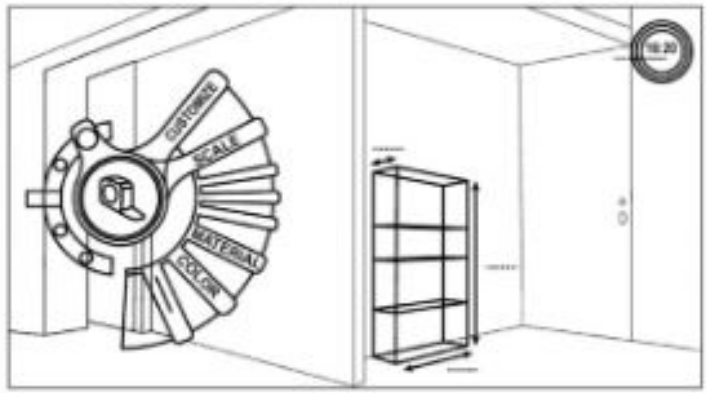


FIG. 50c



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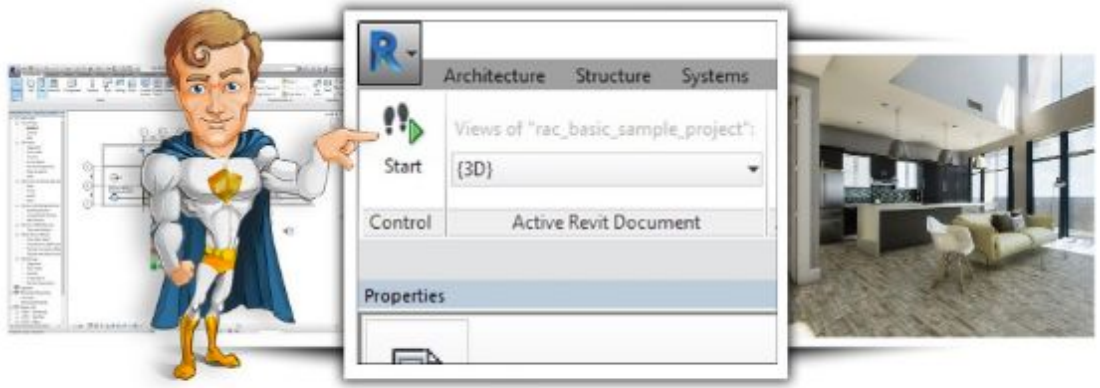
03 Immersion

ENSCAPE™



NVIDIA

AcceleradRT

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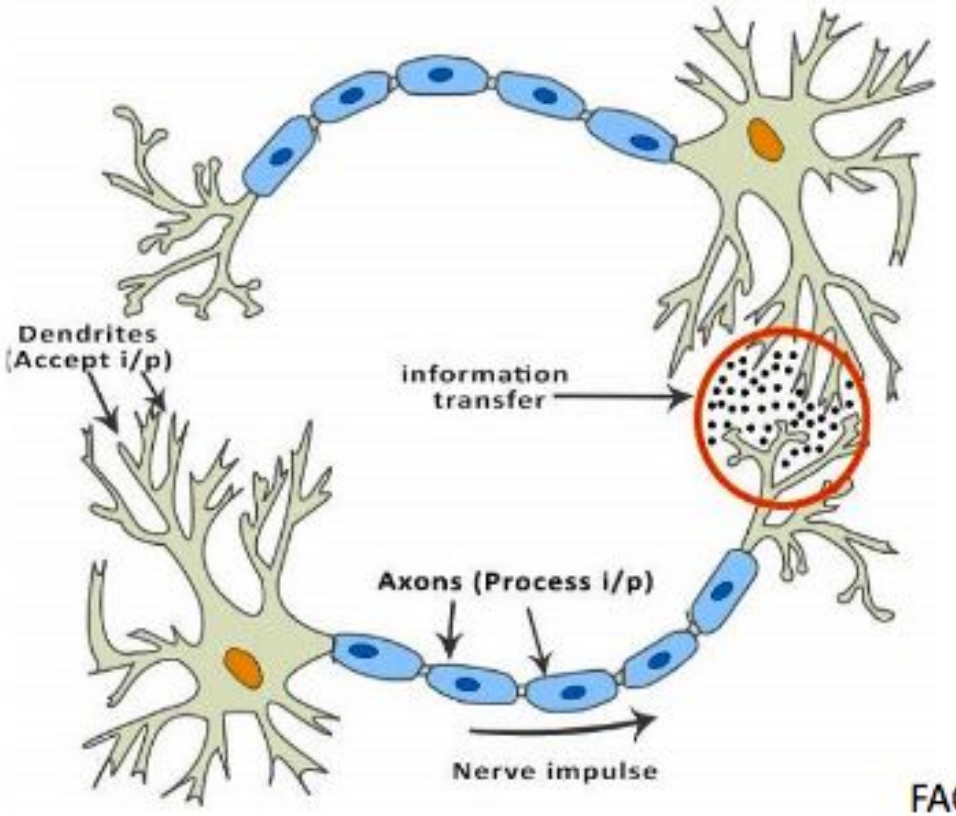
03 Immersion

GOING DEEP



kernel

"…technologies to radically improve and expand human cognition."

NEURALINK

"…ultra high bandwidth brain-machine interfaces [neural lace] to connect humans and computers."

OPENWATER

"…changing how we read and write our brains."

DeepMind

"…programs to solve any complex problem without needing to be taught how."

FACEBOOK Build 8 job posting

develop advanced brain-computer interface technologies

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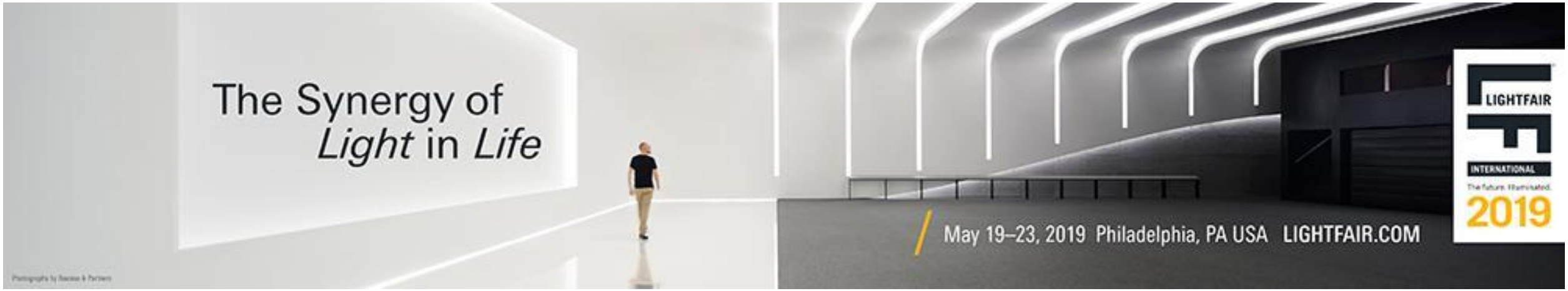
Concluding Thoughts



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