

A Different Perspective For Running Radiance

Daniel Glaser, PhD
Radiance Workshop, ARUP, New York, 2019



A User-Centered Perspective to Daylight Analysis

- Web Application
- Works with Revit, Rhino and SketchUp
- Cloud Computing
- Collaborative



How to Simulate for Daylight Products More Easily?

MicroShade® are available for selection. To download a BSDF file, click on the appropriate MicroShade® type below.

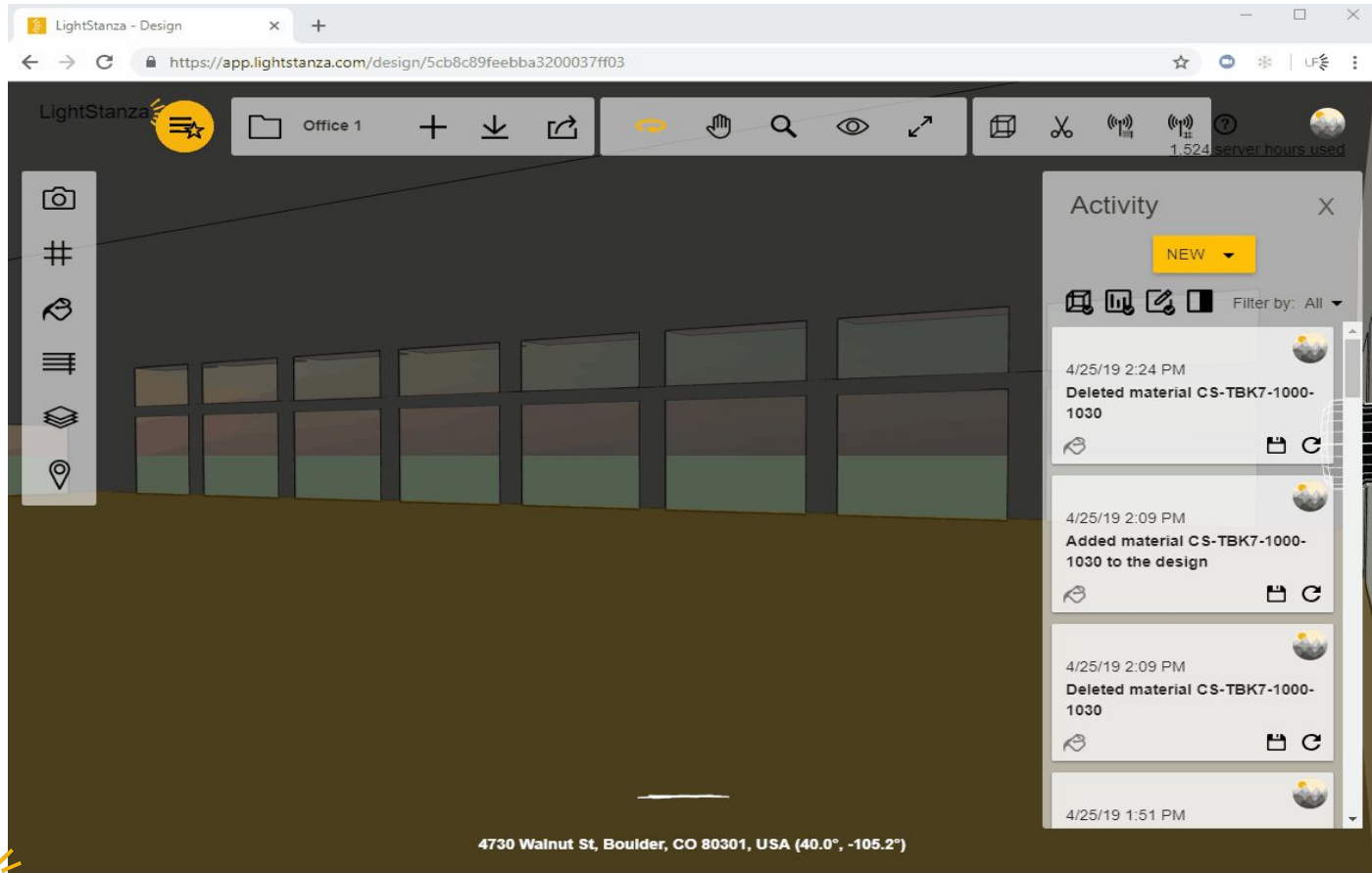
- MS-A (Used in south facing facades)
- MS-D (Used in east and west facing facades)
- MS-RS (Used in roofs with inclination <30°)
- MS-RW (Used in roofs with inclination between 30° and 60°)
 - MS-RW 90° - MS-RW rotated 90°
 - MS-RW 180° - MS-RW rotated 180°
 - MS-RW 270° - MS-RW rotated 270°

Can be Tedious and
Error Prone



A rotation of MicroShade® is normally done to optimize the g-value. For vertical facades MicroShade® are never rotated, while MicroShade® in roof windows can be rotated depending on the orientation and inclination of the roof. Rotation should be considered for MS-RW for orientations between northeast (45°) and northwest (315°) for all roof windows. Please contact MicroShade A/S at support@microshade.dk in these cases to get the right rotation angle.

How to Make this Process Easier?



Manufacturers Provide Free 30-Day Subscriptions



Panelite has teamed with LightStanza to make it fast & easy to evaluate and compare Panelite products with incredible accuracy.

Now you can see how Panelite and dozens of other manufacturer products will perform in your own design in minutes!

Design Model with Ordinary Glass



Design Model with Panelite Clearshade T1WR3



Exclusive Extended Free Trial Offer

4-Week Free Trial

Start Trial

No CC Req'd

- Access all features
- Easily upload your 3D file
- Nothing to download or install

(example: Panelite landing page)

Glare Analysis: Ft. Collins Administration Building, Stantec

Overhangs

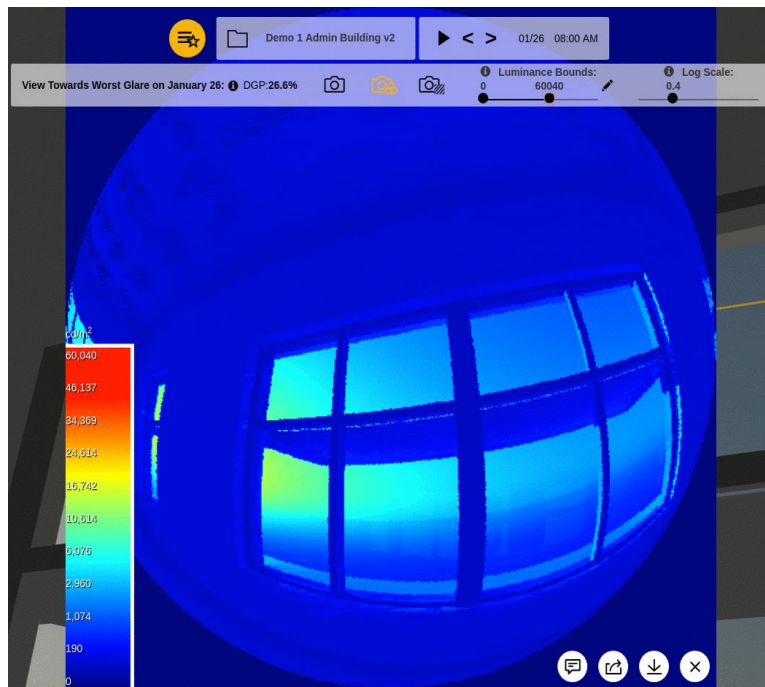


USGBC Mountain West Green Building of the Year (2018)

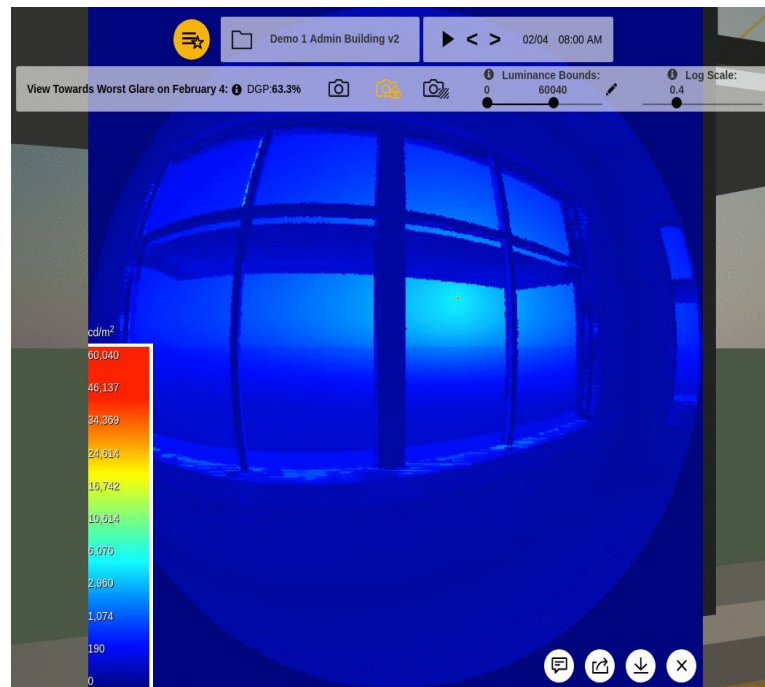
Tracking Winter Glare in a South Facing Office



Tracking Winter Glare in a South Facing Office

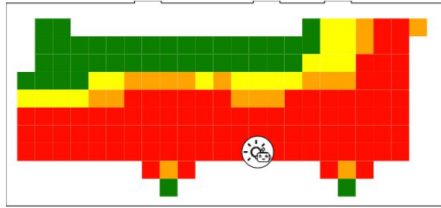


Standard Glass

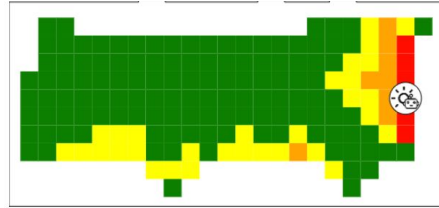


Dynamic Glass

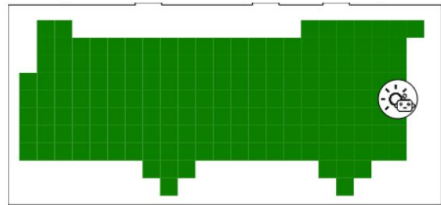
Glare Management Strategies



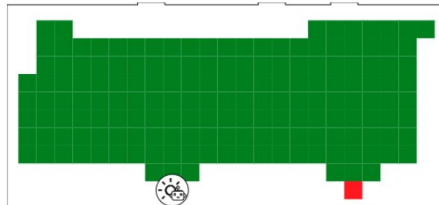
Overhang only



Overhang and Redirect film



Dynamic Glass



Automated Shades

Glare Type	
	Imperceptible
	Perceptible
	Disturbing
	Intolerable

- Full Year Analysis
- 26 view directions from each grid point

Glare Finder

Regular glass 3D view: <http://app.lightstanza.com/gKw1VJJzq>

EC Glass 3D view: <http://app.lightstanza.com/dqBX9Nwur>

Compare mode: <http://app.lightstanza.com/GvAoa849S>

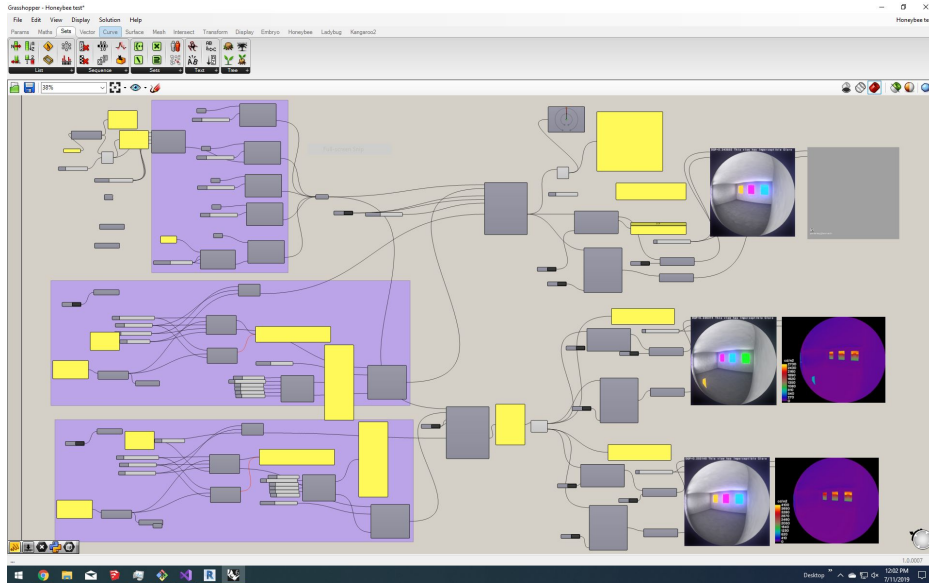
SageGlass-LightStanza Integration Goals

- Allow more people at SageGlass to model their product
- Allow specifiers an easy way to see how their building performs with their glass
- Customized reports
- Anonymous Usage Analytics

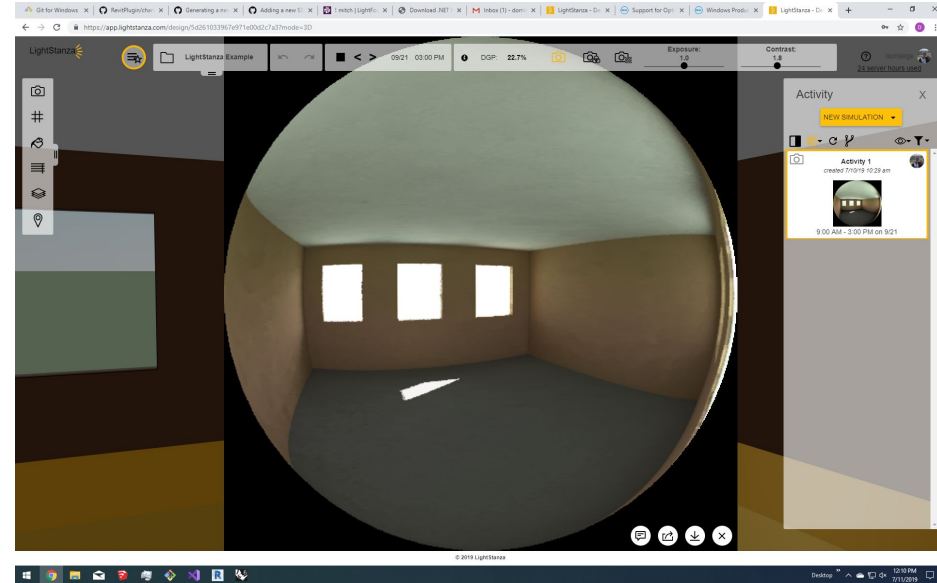


How To Create an Isomorphic Workflow?

Grasshopper



LightStanza



Schedule Comparisons

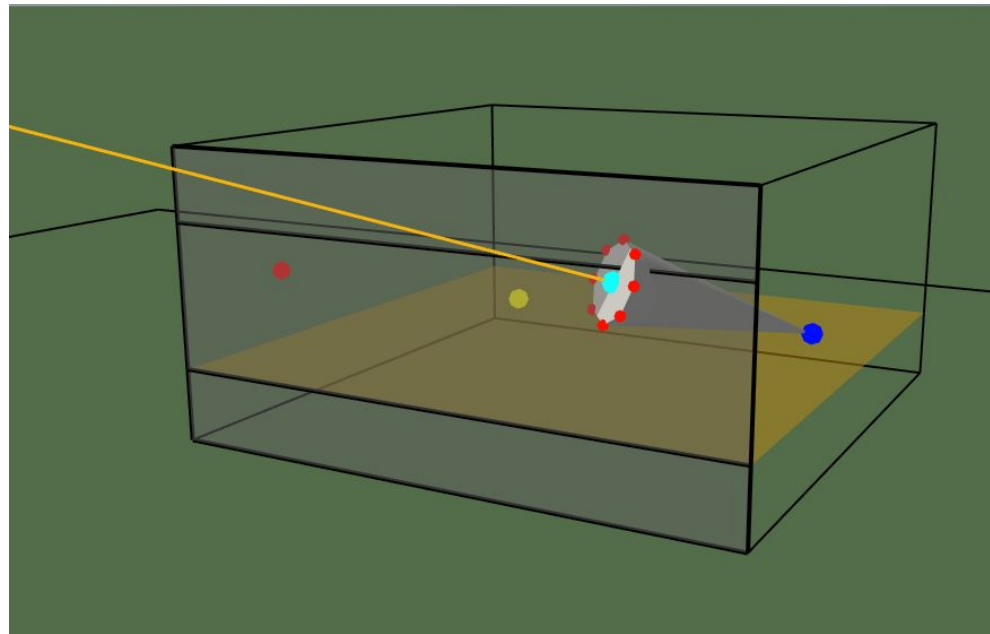
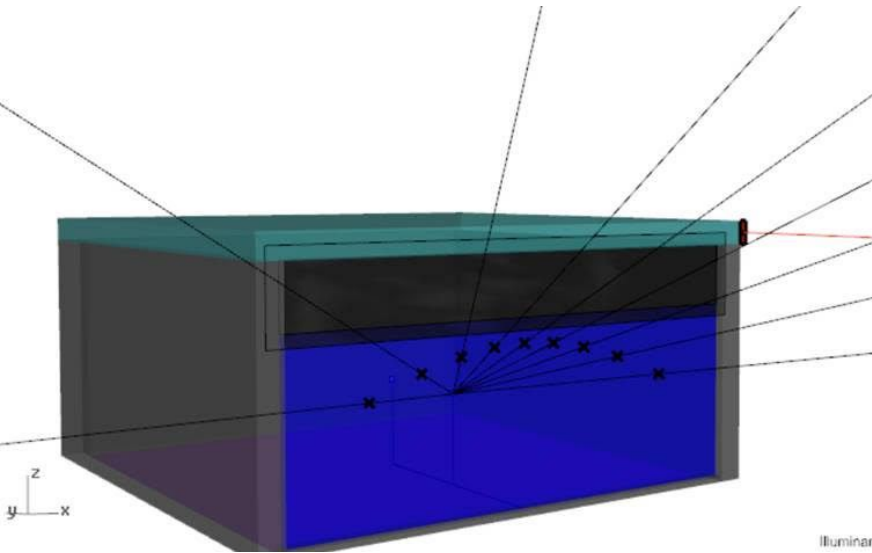
Grasshopper

[illegible]

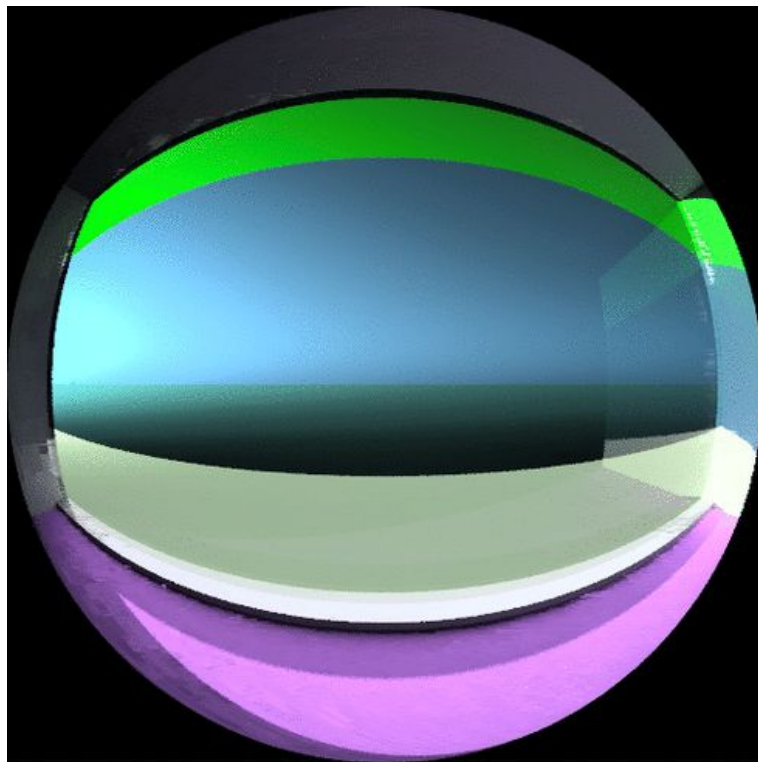
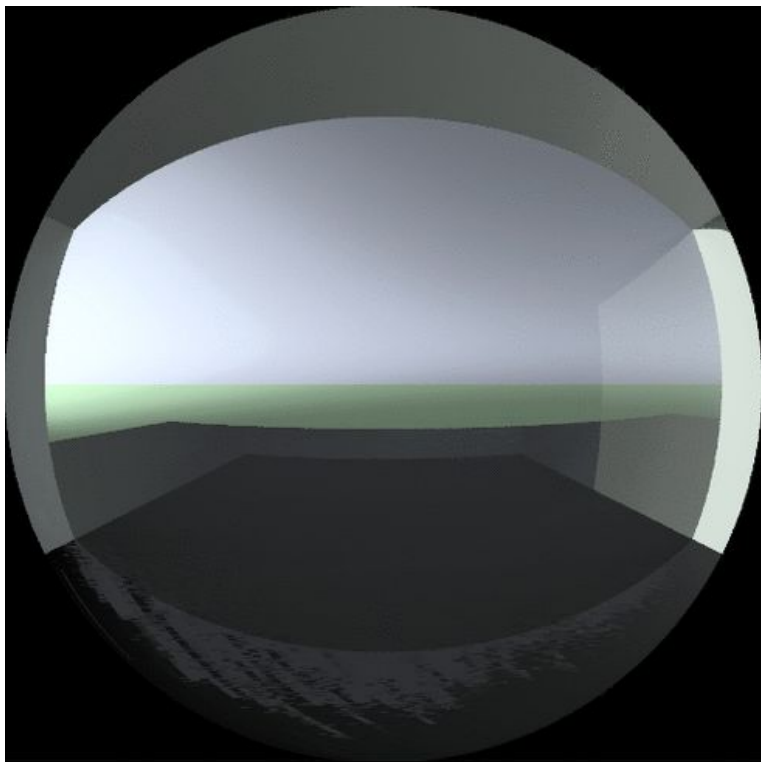
LightStanza

5		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
6		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.01	0.6	0.6
		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
7		0.6	0.18	0.18	0.6	0.6	0.6	0.6	0.18	0.18	0.18	0.18	0.6
		0.01	0.01	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.01	0.01	0.01
		0.6	0.6	0.6	0.6	0.18	0.18	0.18	0.18	0.18	0.6	0.6	0.6
8		0.06	0.06	0.01	0.6	0.6	0.6	0.6	0.06	0.06	0.06	0.06	0.06
		0.01	0.01	0.06	0.18	0.18	0.18	0.18	0.06	0.01	0.01	0.01	0.01
		0.6	0.6	0.6	0.18	0.18	0.18	0.18	0.6	0.6	0.6	0.6	0.6
9		0.06	0.06	0.01	0.6	0.6	0.6	0.6	0.01	0.01	0.06	0.06	0.06
		0.01	0.01	0.06	0.06	0.18	0.18	0.18	0.06	0.06	0.06	0.01	0.01
		0.6	0.6	0.6	0.06	0.18	0.18	0.18	0.06	0.6	0.6	0.6	0.6
10		0.06	0.01	0.01	0.6	0.6	0.6	0.6	0.6	0.01	0.01	0.06	0.06
		0.01	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.01	0.01
		0.6	0.6	0.6	0.06	0.06	0.06	0.06	0.06	0.6	0.6	0.6	0.6
11		0.06	0.01	0.01	0.6	0.6	0.6	0.6	0.01	0.01	0.06	0.06	0.06
		0.01	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.01	0.01
		0.6	0.6	0.6	0.06	0.06	0.06	0.06	0.06	0.6	0.6	0.6	0.6
12		0.06	0.01	0.01	0.6	0.6	0.6	0.6	0.01	0.01	0.06	0.06	0.06
		0.01	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.01	0.01
		0.6	0.6	0.6	0.06	0.06	0.06	0.06	0.06	0.6	0.6	0.6	0.6
13		0.06	0.01	0.01	0.6	0.6	0.6	0.6	0.01	0.01	0.06	0.06	0.06
		0.01	0.06	0.06	0.06	0.06	0.18	0.06	0.06	0.06	0.06	0.01	0.01
		0.6	0.6	0.6	0.06	0.06	0.18	0.06	0.06	0.6	0.6	0.6	0.6
14		0.06	0.01	0.01	0.6	0.6	0.6	0.6	0.01	0.06	0.06	0.06	0.06
		0.01	0.06	0.06	0.06	0.18	0.18	0.18	0.06	0.06	0.01	0.01	0.01
		0.6	0.6	0.6	0.06	0.18	0.18	0.18	0.06	0.6	0.6	0.6	0.6
15		0.18	0.06	0.01	0.6	0.6	0.6	0.6	0.01	0.18	0.18	0.18	0.18
		0.01	0.01	0.06	0.18	0.18	0.18	0.18	0.06	0.01	0.01	0.01	0.01
		0.6	0.6	0.6	0.18	0.18	0.18	0.18	0.18	0.6	0.6	0.6	0.6
16		0.6	0.18	0.01	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.01	0.18	0.18	0.18	0.18	0.18	0.18	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6	0.18	0.18	0.18	0.18	0.18	0.6	0.6	0.6

1 vs 3 Test Points, Lines vs. Cones



Dynamic Glass with Multi-Zone Optimization



SageGlass Control Panel

Complex Glazing (Manufacturer) ▾

SageGlass Automatic Zones

Please note that the changes made here will apply to all SageGlass materials in this design.

Glare Control ▾

Test Point 1 5 ft from window

 5 ft from floor

[+ Add Another](#)

[Reset to Default](#)

Daylight Control ▾

☐ Use Heating/Cooling Periods

Set Point 3200

[Reset to Default](#)

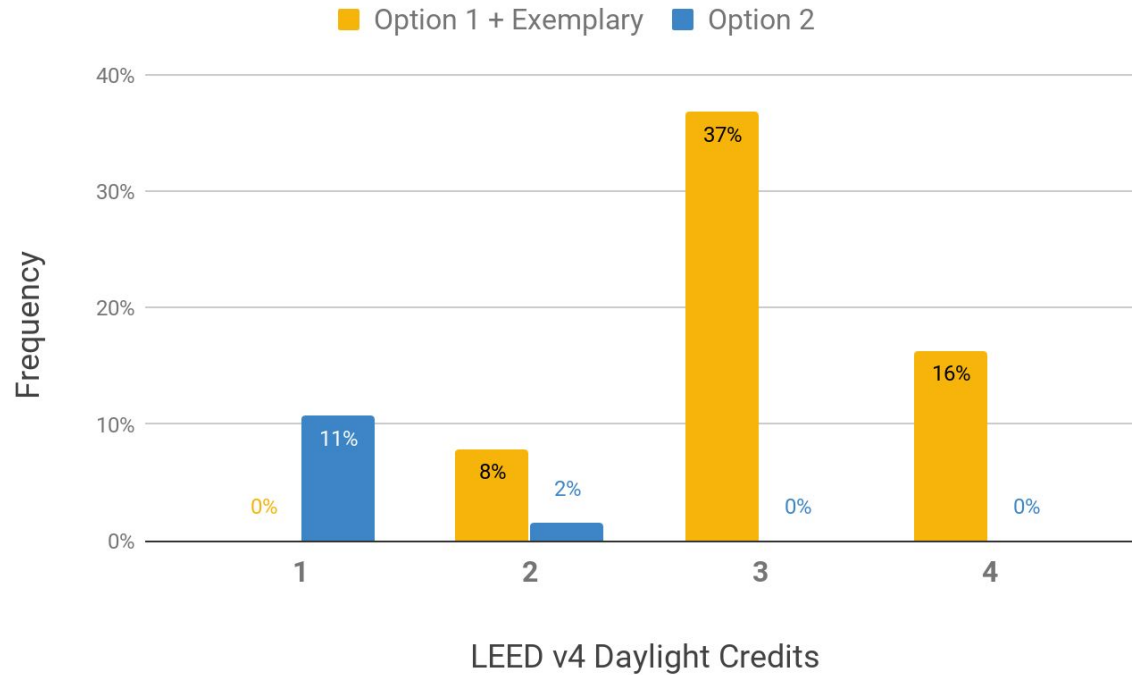
CANCEL **OK**

Specifier



Manufacturer

What are Anonymous Usage Analytics?



Presented at Greenbuild 2018

Daylight Design FAIL:

All blinds are drawn in the middle of the day



Shade Modeling

2019

PROJECT STASIC (Student Residence Apartments and Offices)

CREATED WITH

Light
Stanza

BY

VERDACITY

KEY:
 0% 50%
 Percent of annual hrs with usable light levels

BLINDS_IES LM-83



sDA
63%

sDA
72%

sDA
50%

sDA
38%

BLINDS_NONE

BLINDS_24 HR HYSTERSIS

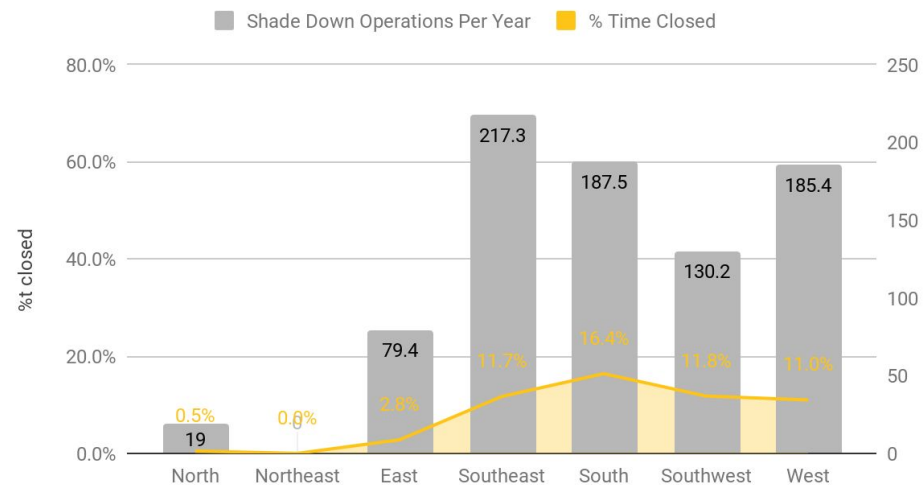
BLINDS_24 HR HYSTERSIS + 0.5% TRIGGER

Shades are Automatically Applied to Every Window*

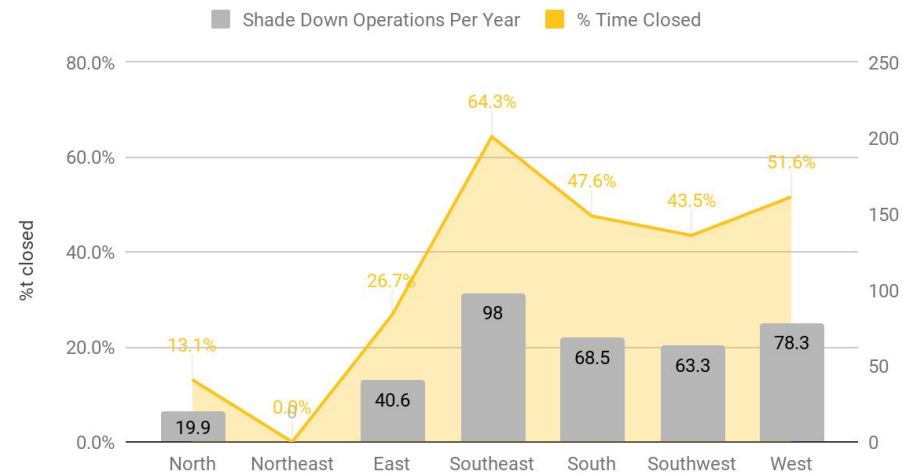


Shade Reports

Spatial Daylight Autonomy

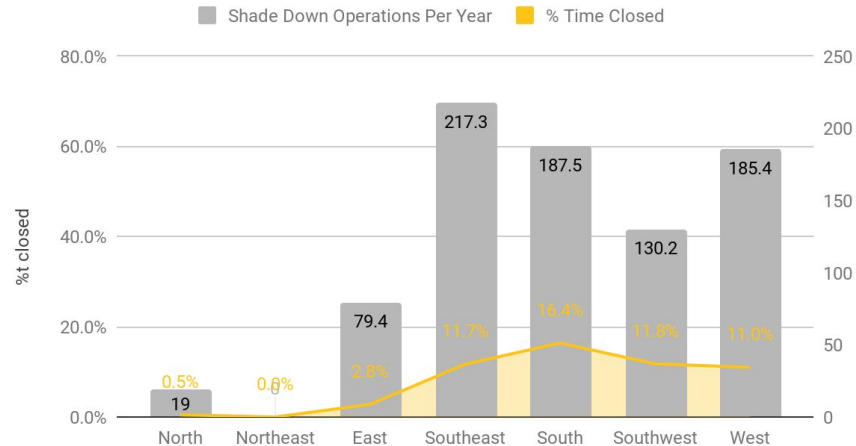


Spatial Daylight Autonomy (24 Hour Hysteresis, 0.5% Trigger)

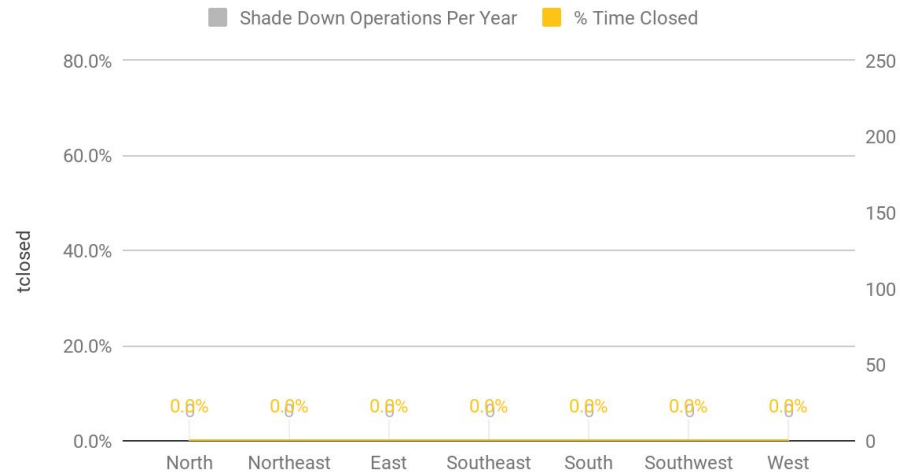


Shade Reports

Spatial Daylight Autonomy



Spatial Daylight Autonomy (No Shades)



LightStanza Report Data

i Blinds:

5% Shade White (Dynamic; Offset 1.00 in.; 0.5% Area Trigger; 1,000 lux Direct Sun Trigger)

Blinds Hysteresis: 24 hours

i Blinds Summary

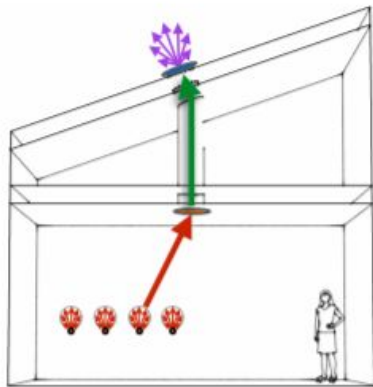
	N _{groups}	i t _{closed}	i N _{down}	i N _{up}
North	16	13.1%	19.9	19.9
Northeast	5	0.0%	0.0	0.0
East	14	26.7%	40.6	40.4
Southeast	4	64.3%	98.0	97.0
South	10	47.6%	68.5	67.7
Southwest	13	43.5%	63.3	62.6
West	7	51.6%	78.3	78.0
i All	69	32.5%	48.3	48.0

Can We Predict This?



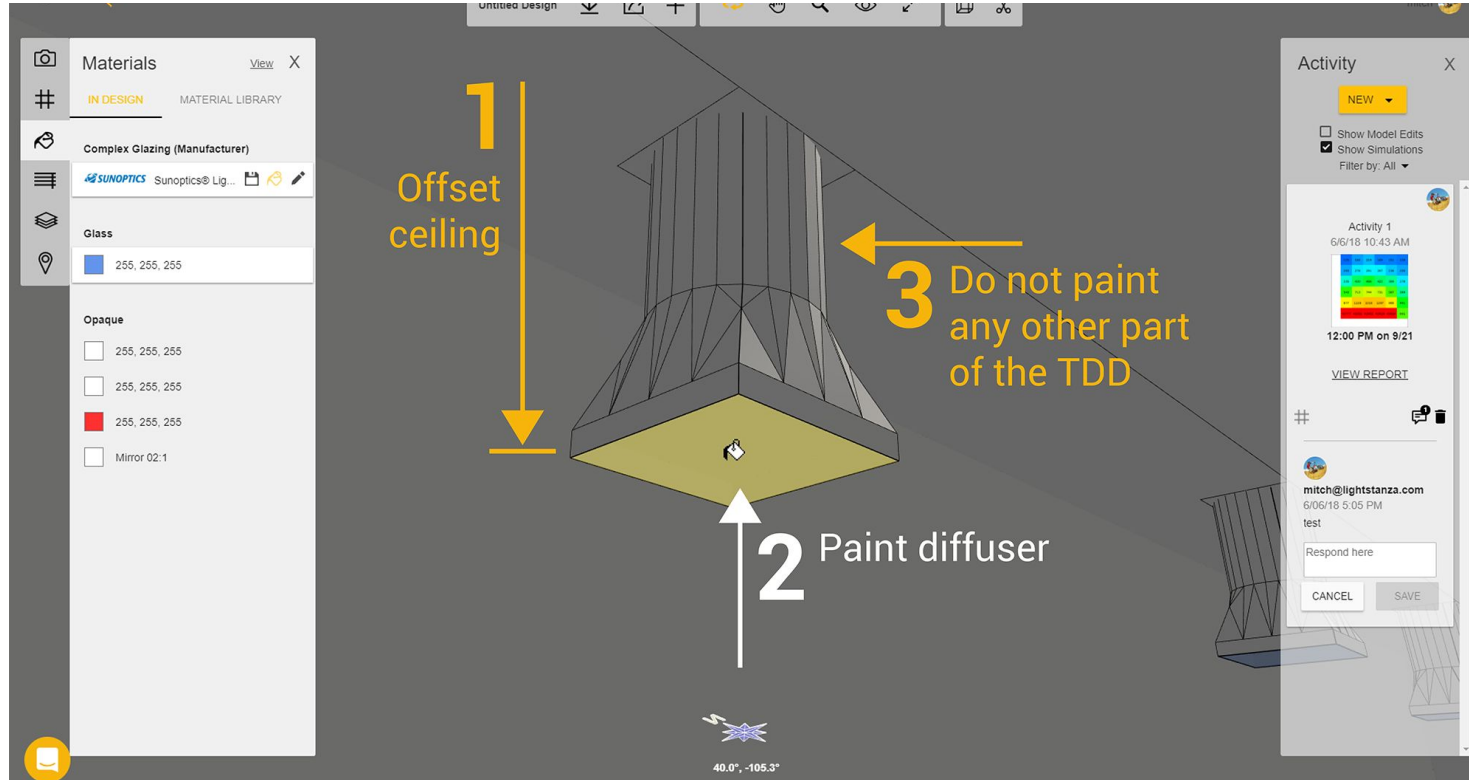
Tubular Daylight Device (TDD) Modeling

```
rmtxop results/points.vmx bsdf/lens.xml \  
results/LP_trans.mtx bsdf/glass.xml \  
results/exterior.dmx skies/12_21_15.skv  
| rmtxop -fa -c 47.4 119.9 11.6 - > illum_12_21_15.txt  
└─(Change from Irradiance to Illuminance)
```



```
#?RADIANCE  
rmtxop -fa -c 179 0 0 -  
NROWS=5  
NCOLS=1  
NCOMP=1  
FORMAT=ascii  
  
2.767935412636226e+00  
2.971198976613583e+00  
3.337874915476797e+01  
3.173601257922114e+00  
3.558548860092117e+00
```

Model TDDs as a Diffuser



* Can import XML Files

Bulk Simulation



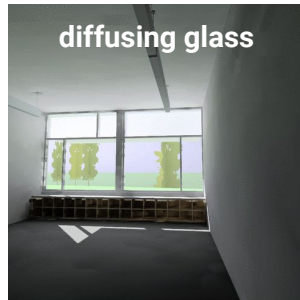
AVG=2147 lux
DA=93%
ASE=50%
GLARE=56%



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



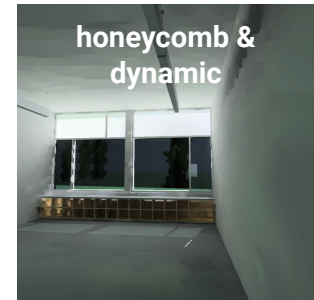
AVG=2156 lux
DA=73%
ASE=25%
GLARE=0%



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%

Bulk Simulation



Designs

Created on May 19, 2019

Panelite Top Sage Glass Bot

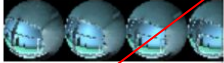


✓





Created on May 19, 2019

Dynamic Glass

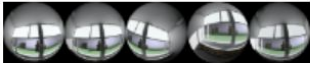


✓





Created on Nov 11, 2018

diffusing glass




✓





Created on Nov 11, 2018

NO OVERHANG




✓





Created on Nov 11, 2018

overhang




✓

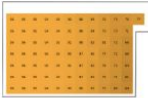


Click here to include this design in any simulations from this page. An orange icon means that this design will be included (viewpoints and illuminance grids that are checked "on" inside of this design) in your simulation. A black icon means that it will not be included.

Activity

NEW SIMULATION

 **NO OVERHANG**
blinds operation
created 5/21/19 10:25 am



ASE, AVERAGE ILLUMINANCE, DA,
UDI, cDA, sDA, sDS

Type comment here

Bulk Simulation

Live Links:

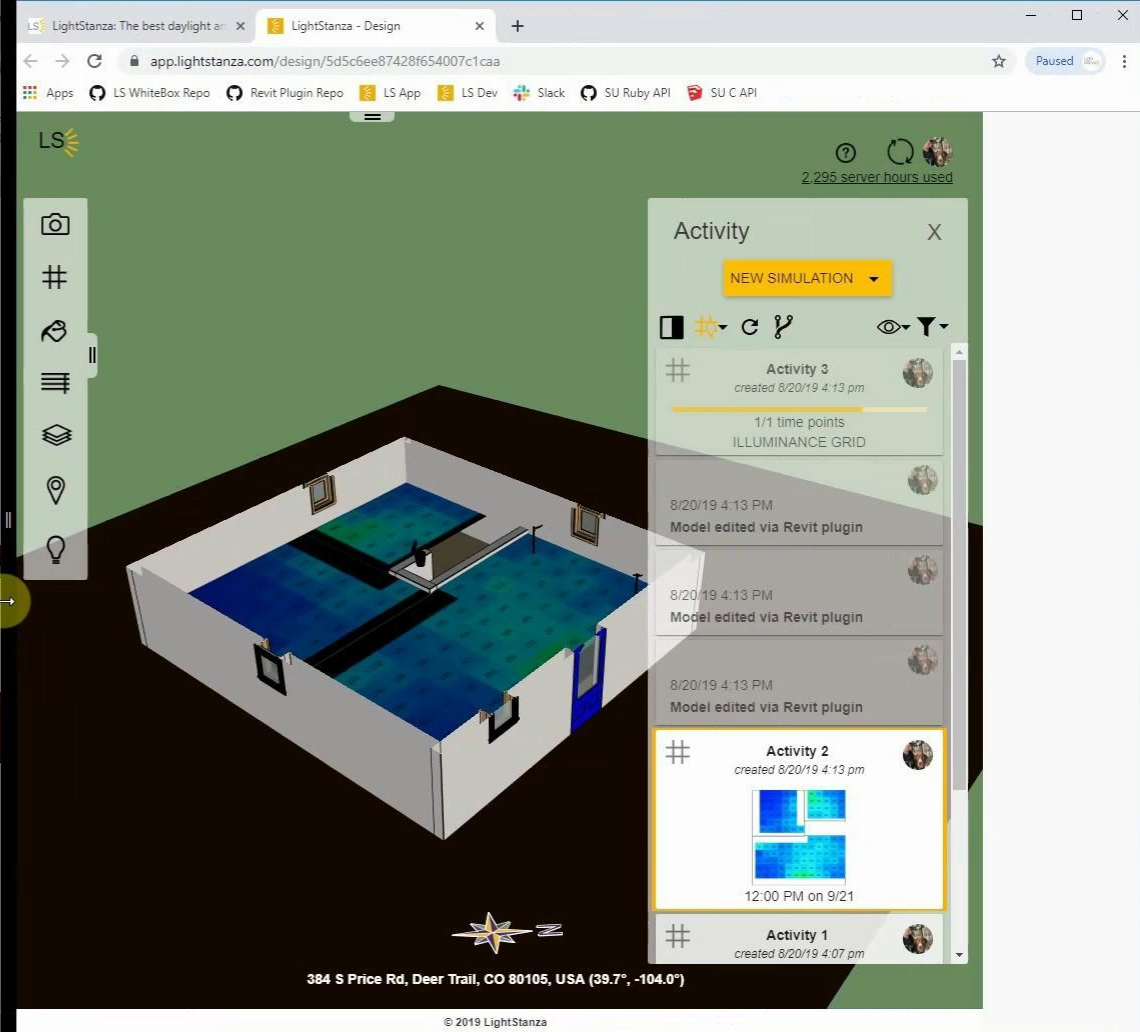
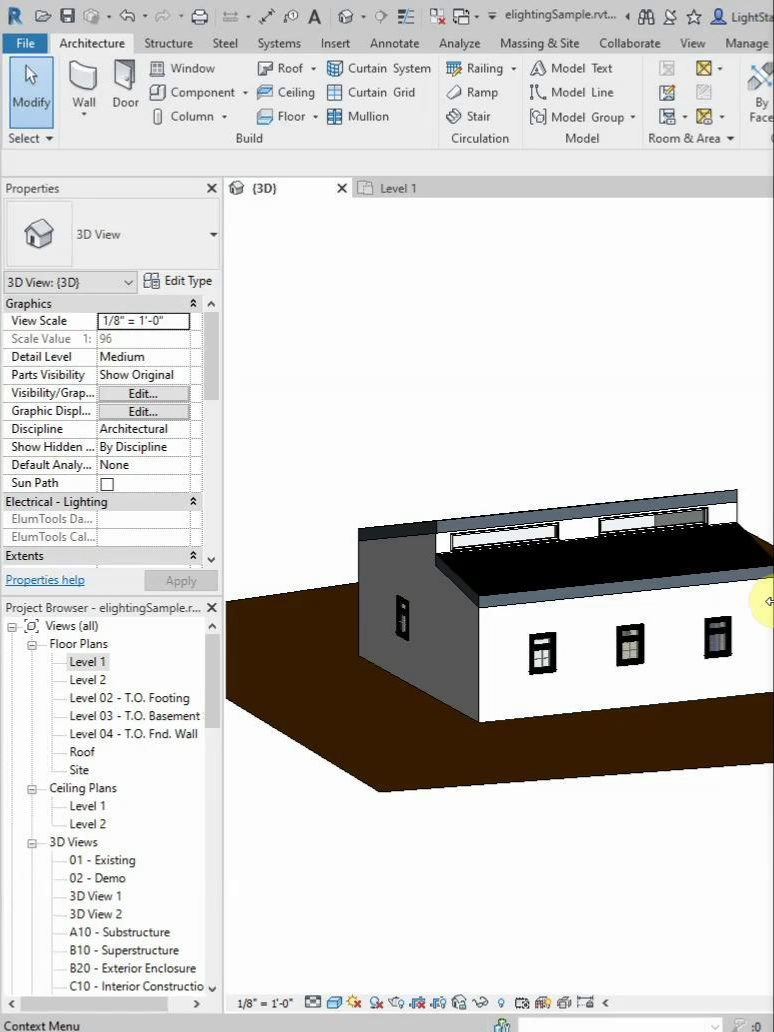
- Individual Design:
 - <http://app.lightstanza.com/halst7cVA>
- [New Project](#)

Electric Light Modeling

- Similar goals for daylight tools
- Synergies between daylight and electric light?
- New to LightStanza



Sep 21, 18:00



Discussion/Questions



Daniel Glaser, PhD, Founder

(720) 722.0771

daniel@lightstanza.com

Boulder, CO