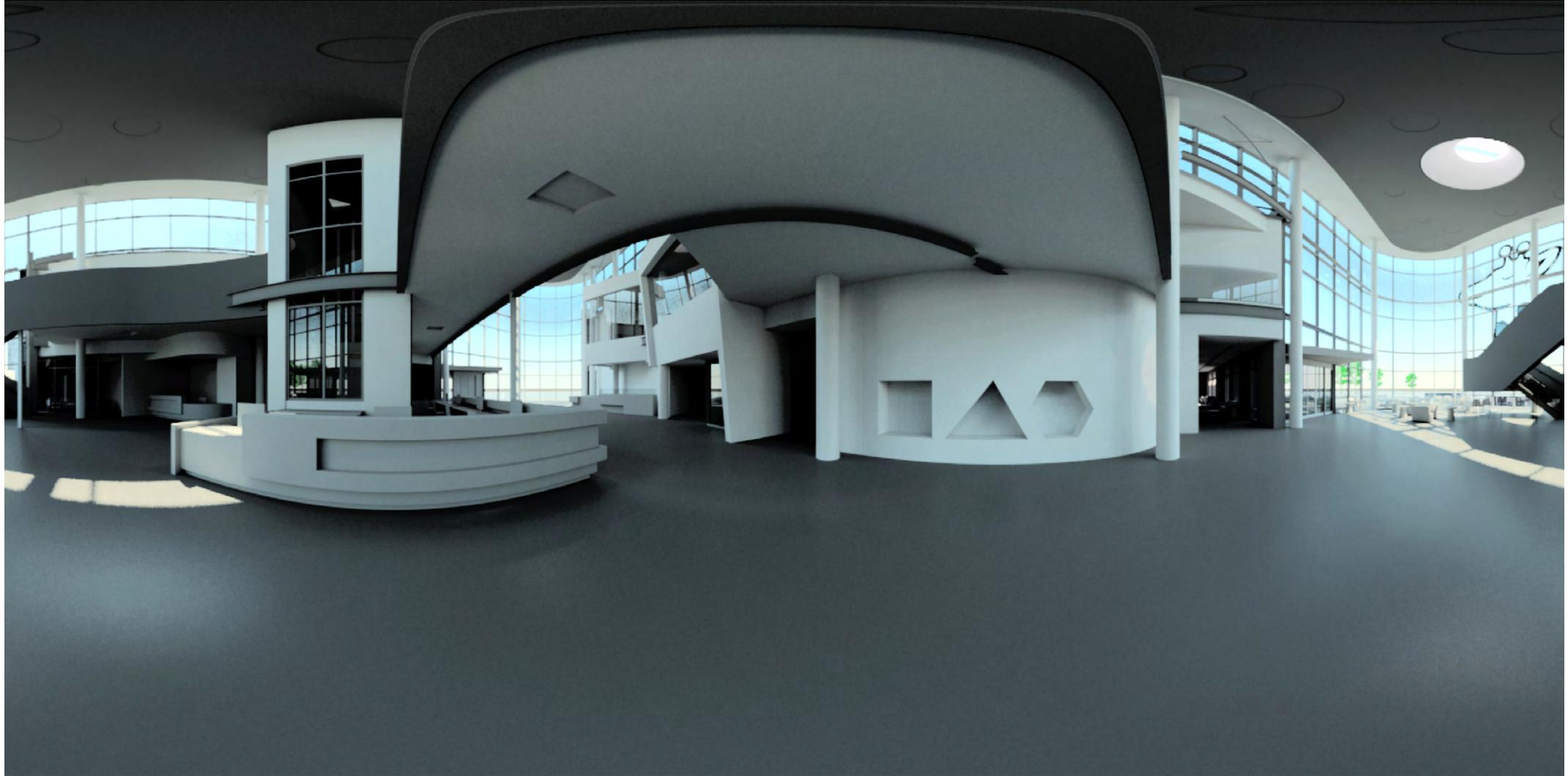


# Simulating eye adaptation and visual acuity in VR/photosphere : Work in Progress

Rendered 3D View : processed with pcond -h -v-



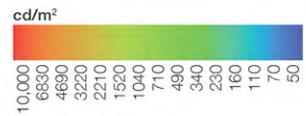
Thanks for the projection Andy

VR view web : Google VR JavaScript API (DEMO)

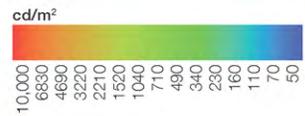
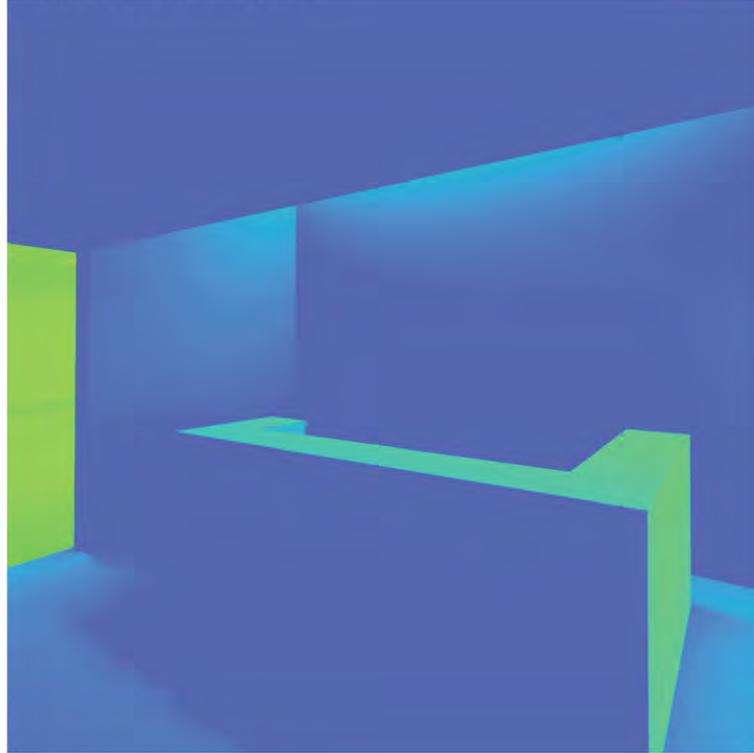


# Adaptation and Progression Through Space

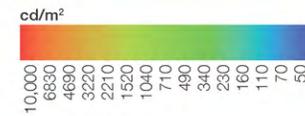
Falsecolor Luminance Map  
Average Scene Luminance: 2785 cd/m<sup>2</sup>



Falsecolor Luminance Map  
Average Scene Luminance: 55 cd/m<sup>2</sup>



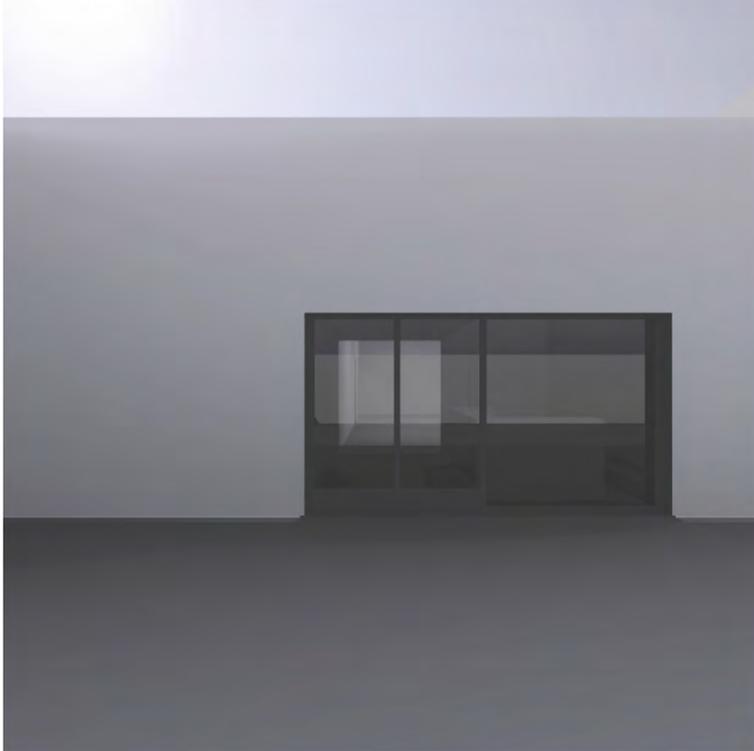
Falsecolor Luminance Map  
Average Scene Luminance: 1105 cd/m<sup>2</sup>



credit: Michael Martinez for L+U

# Adaptation and Progression Through Space

Perspective View :: Exterior



Perspective View :: Entry with Exposure Matching Exterior



Perspective View :: Entry with Exposure After 30-60 seconds Adaptation



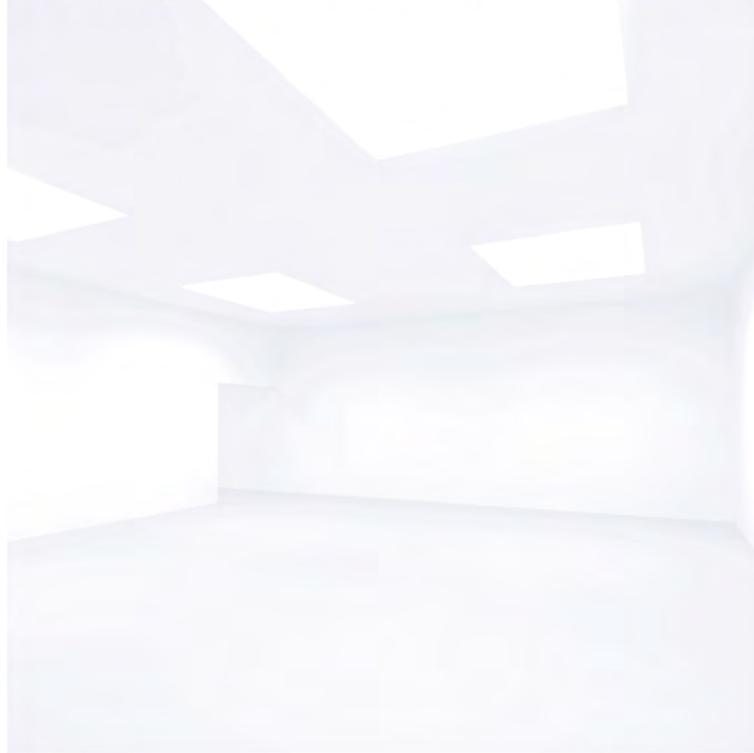
credit: Michael Martinez for L+U

# Adaptation and Progression Through Space

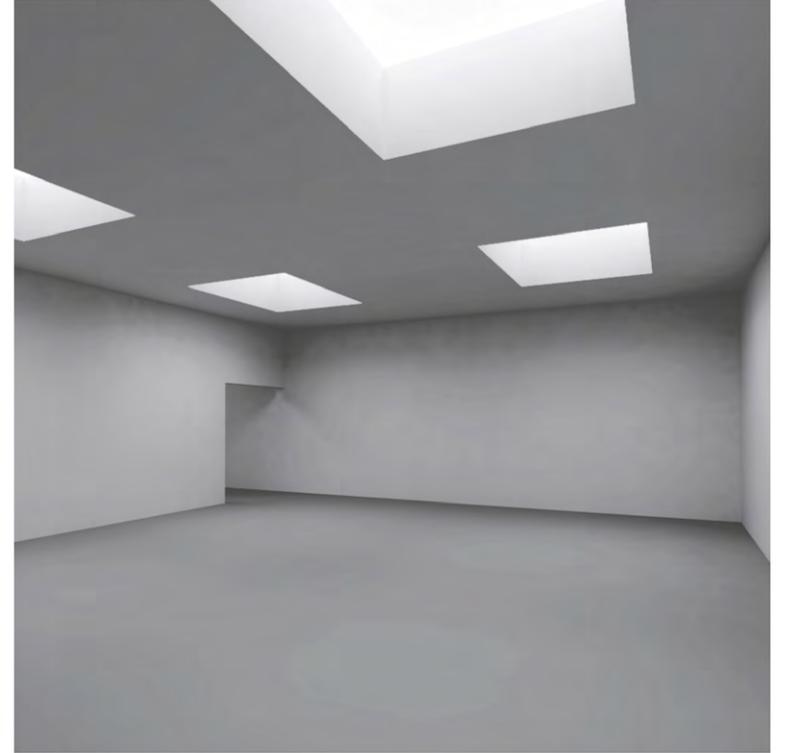
Perspective View :: Entry



Perspective View :: Gallery with Exposure Matching Entry



Perspective View :: Gallery with Exposure After 5-10 seconds Adaptation



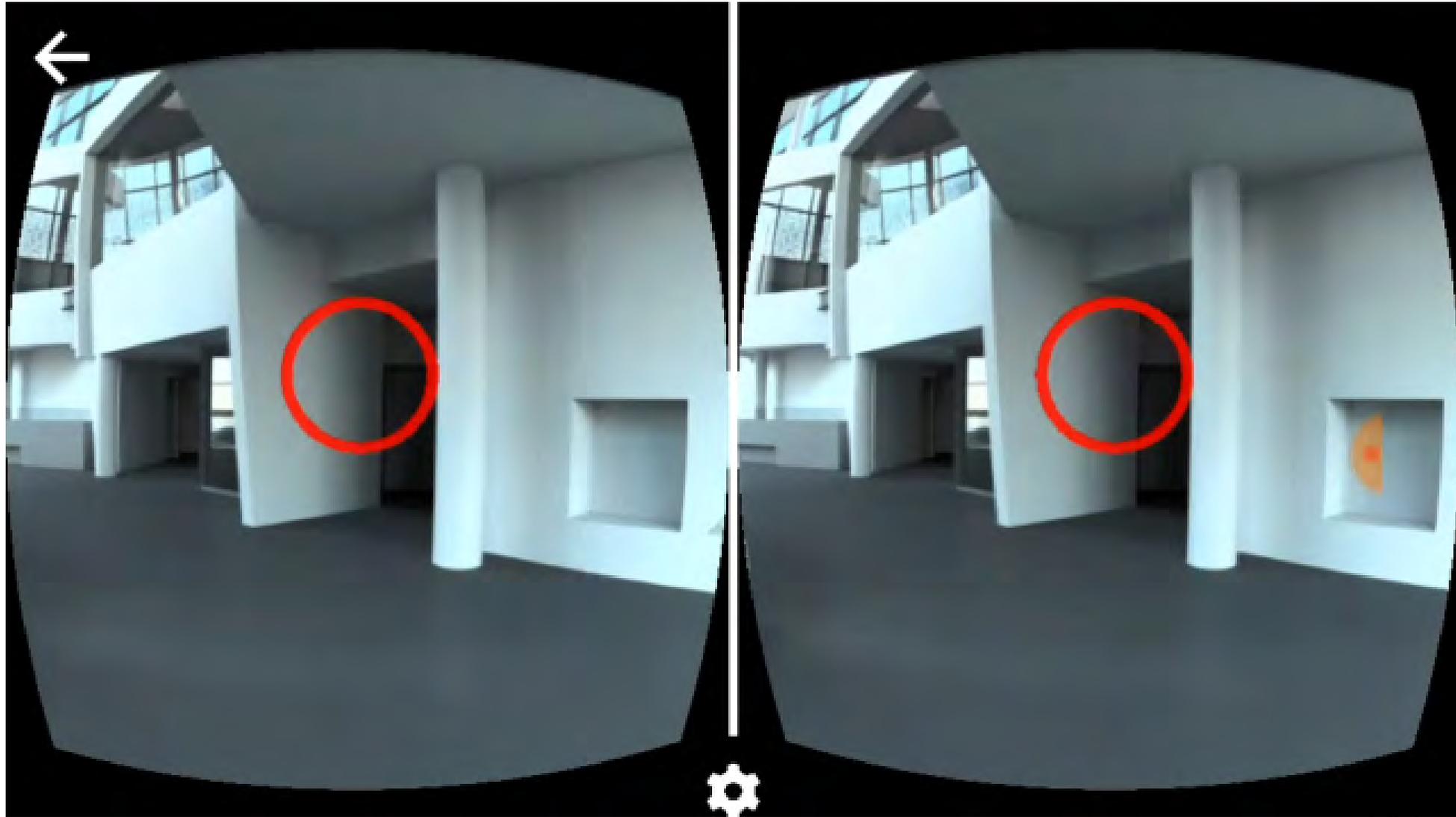
credit: Michael Martinez for L+U

# Progression of view around space : Not Linear : Will the Same Approach Work?





# Target Adaptation (DEMO)

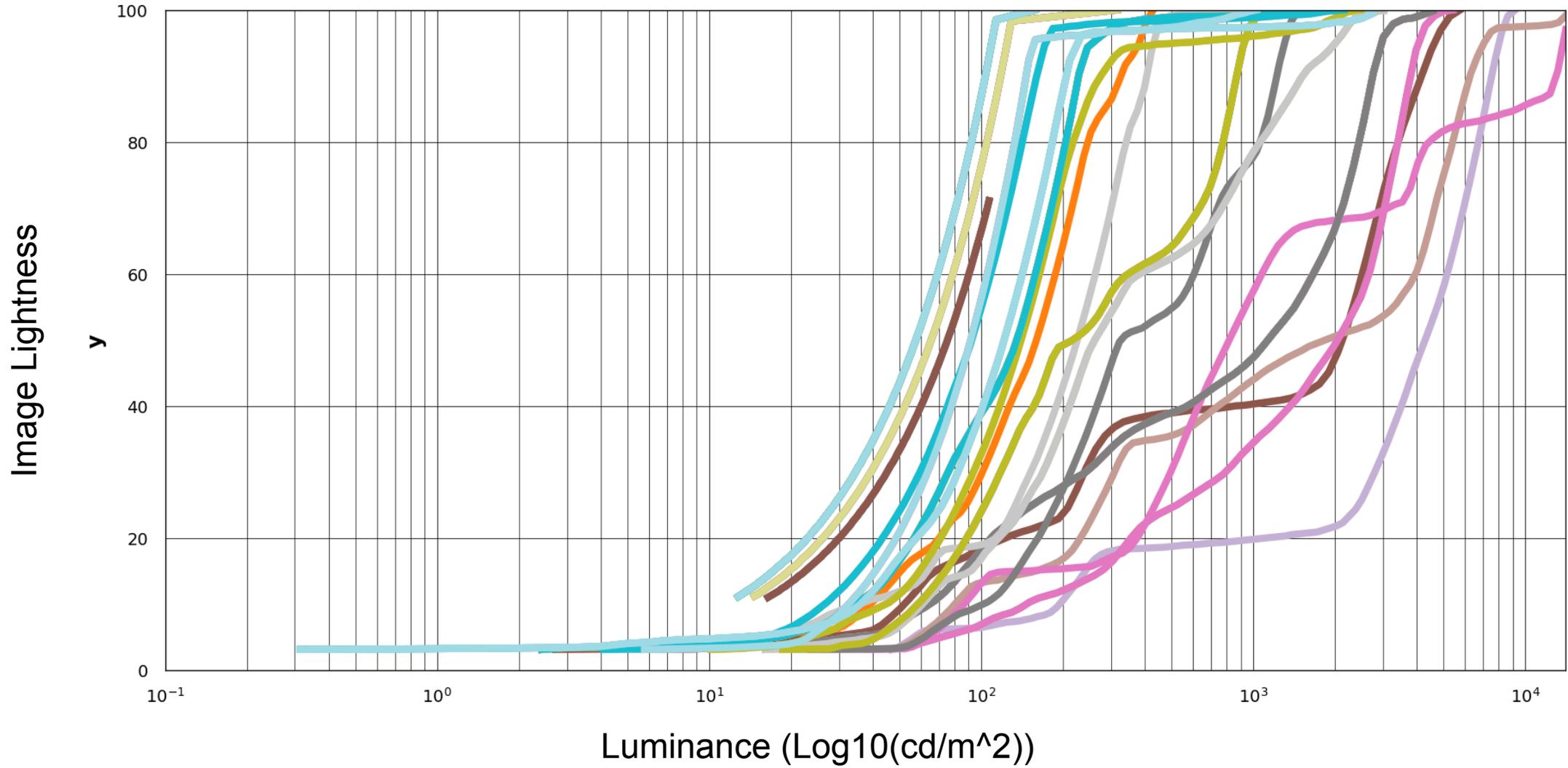


Video

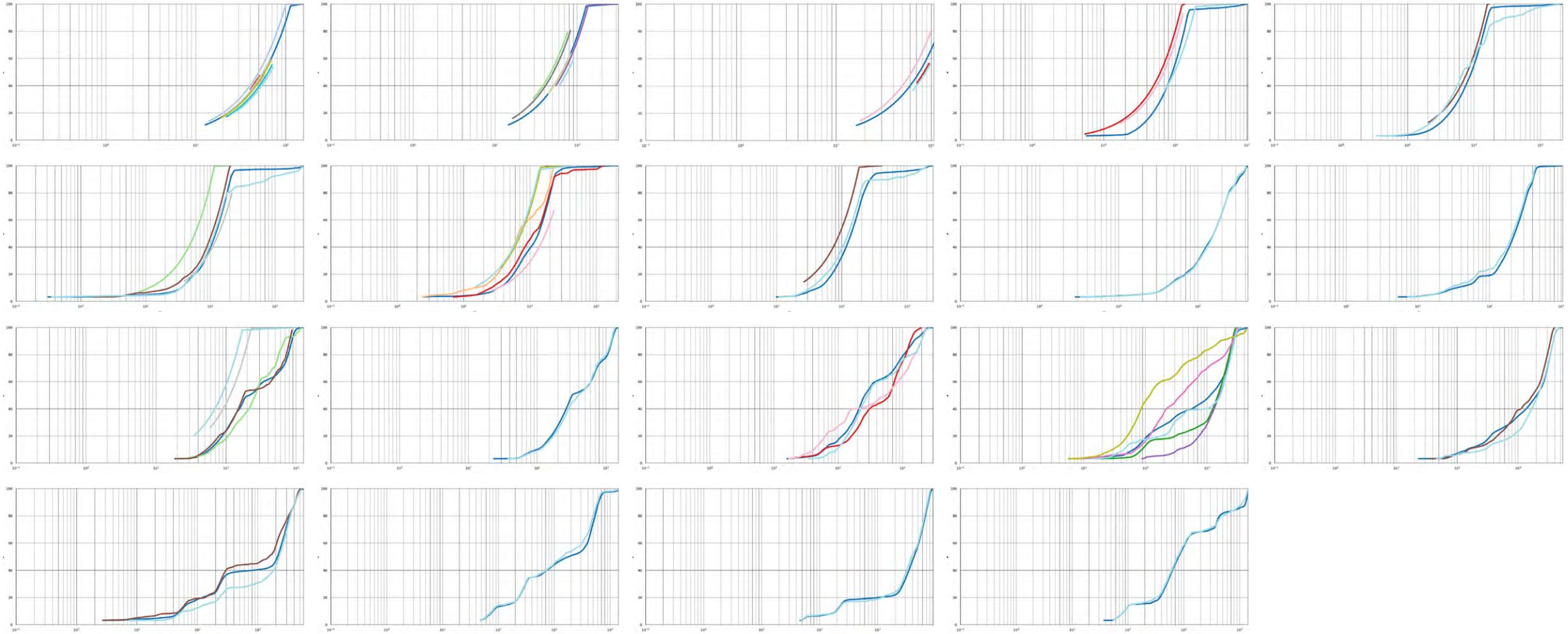
# Adaptation Grid (DEMO)



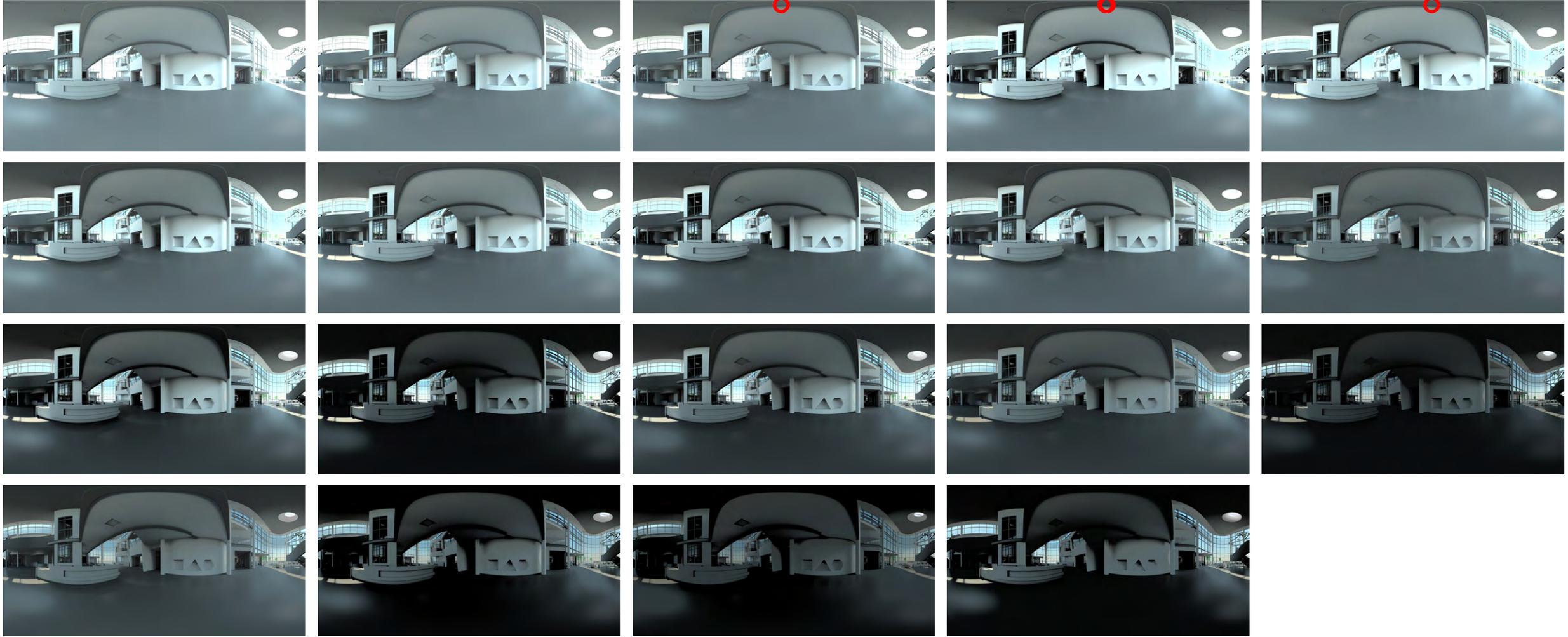
# Response Curves



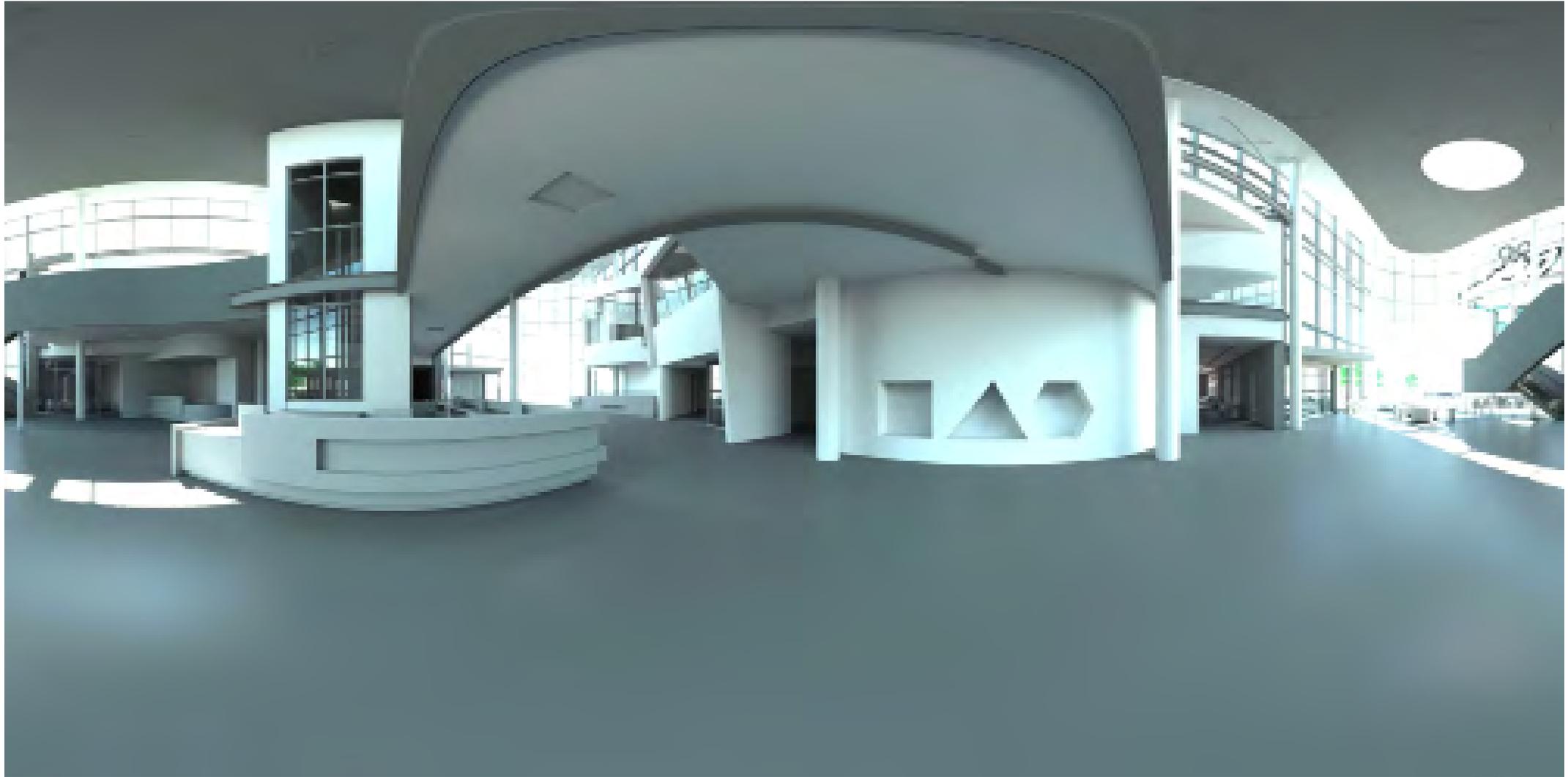
# Sorted Response Curves



# Exposure levels



# Exposure Sequence



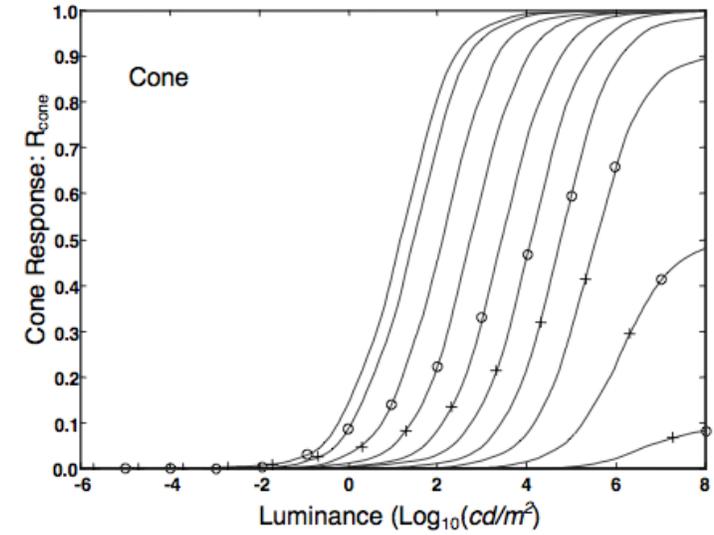
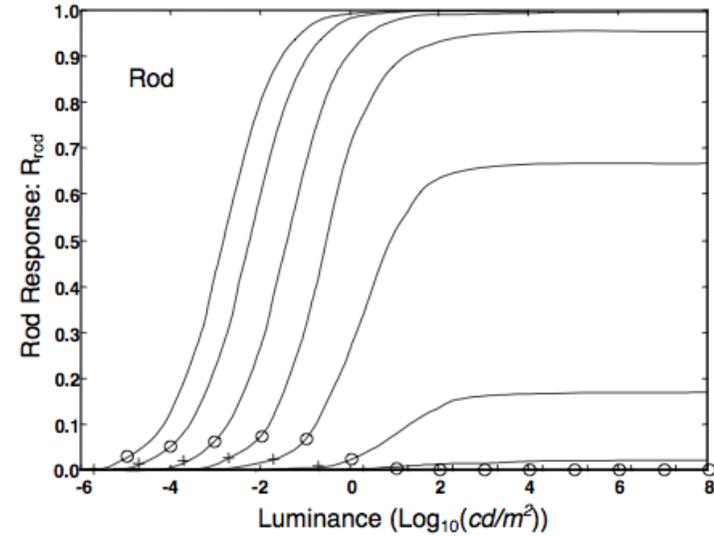
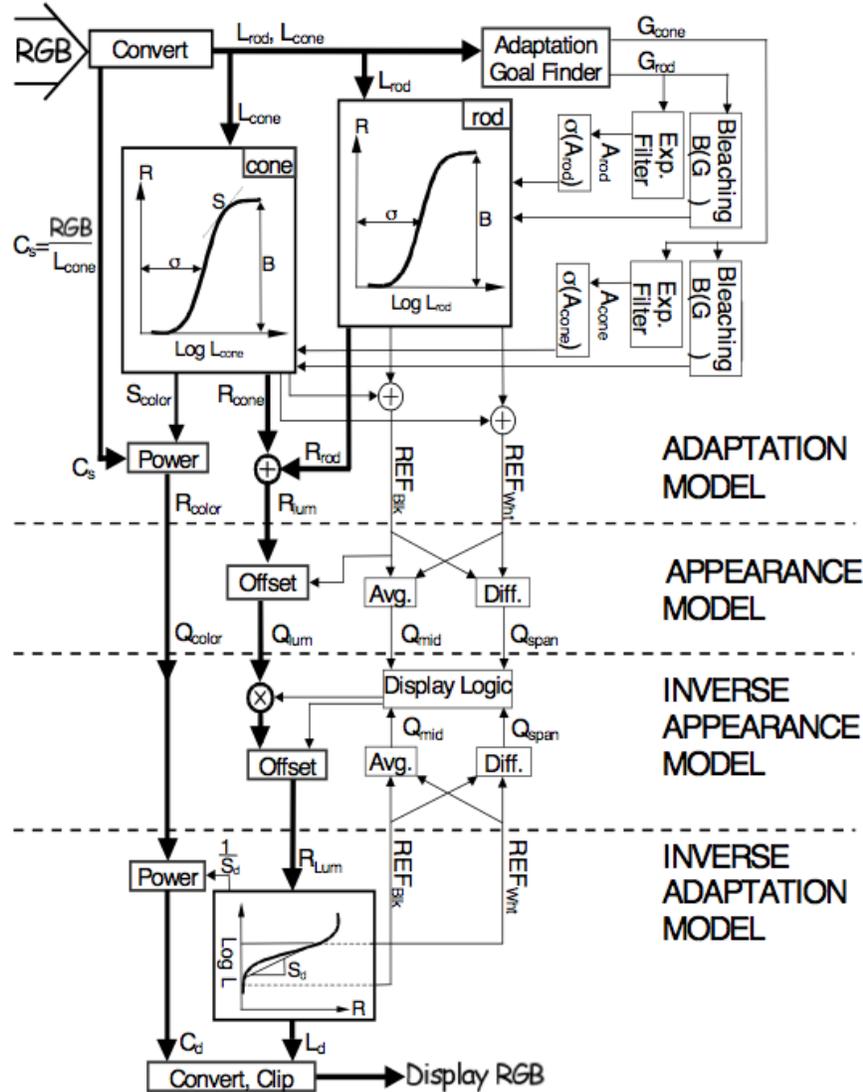
Video

Radiance Conference  
08.23.2017

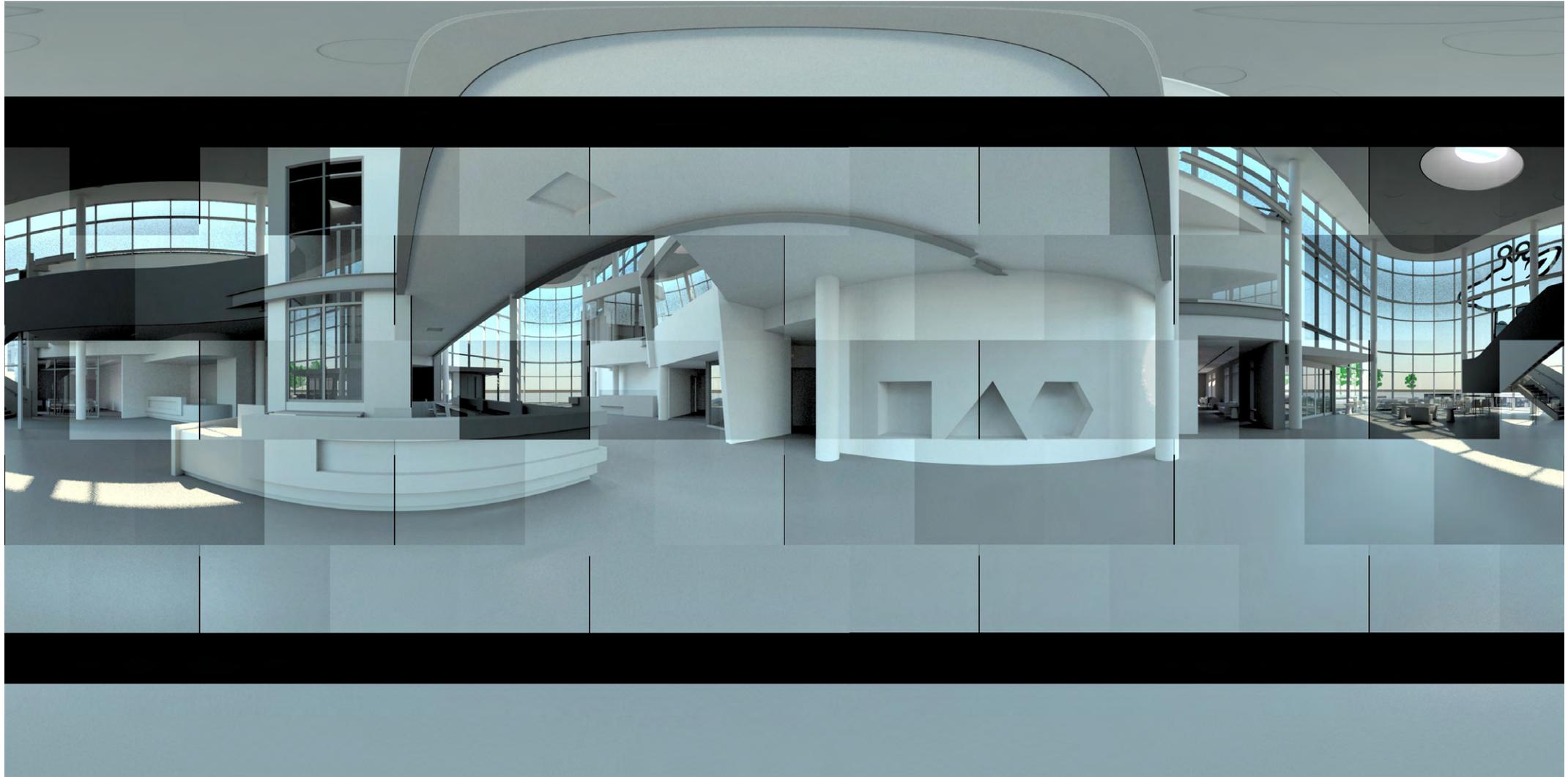
LOISOS + UBBELOHDE  
ARCHITECTURE . ENERGY . LIGHT

# Time-Dependent Visual Adaptation

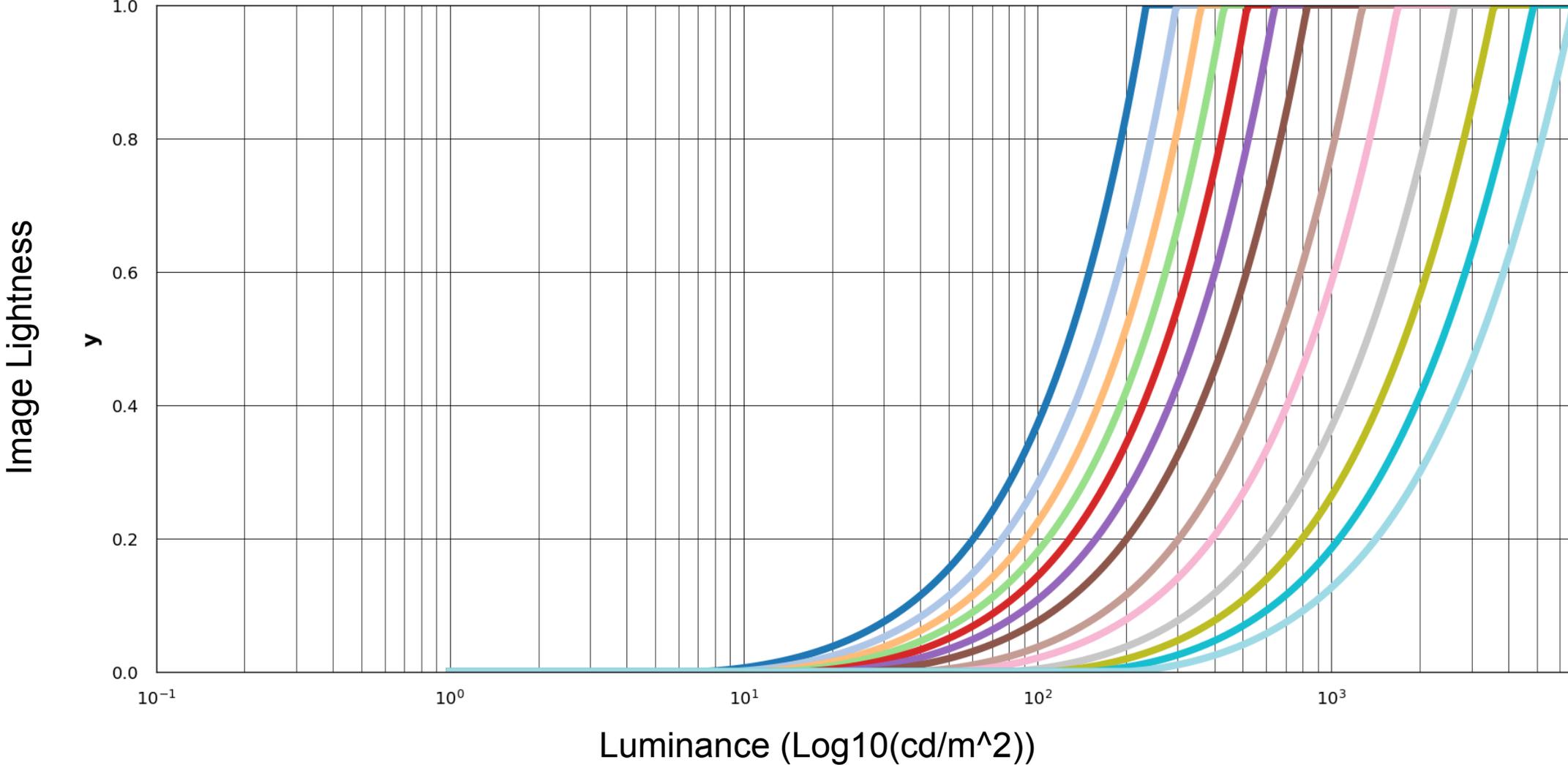
Sumanta N. Pattanaik, Jack Tumblin, Hector Yee, Donald P. Greenberg (2000)



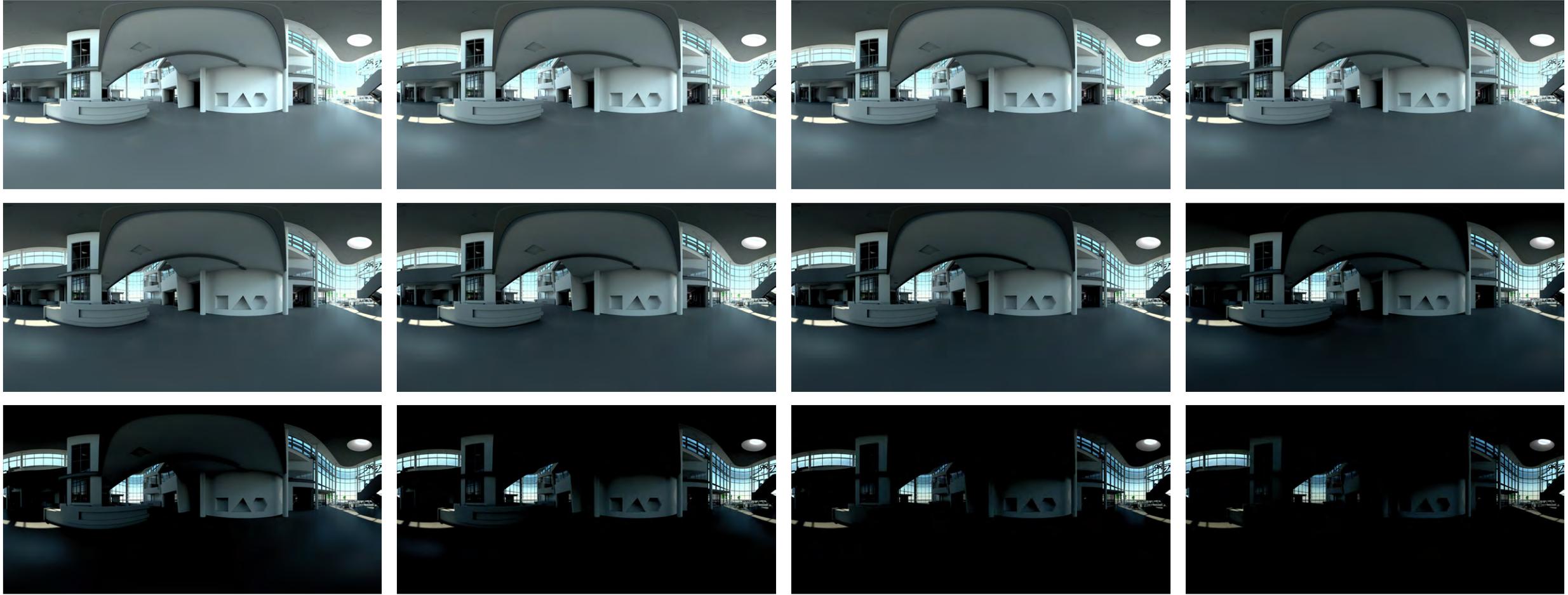
# Adaptation Grid



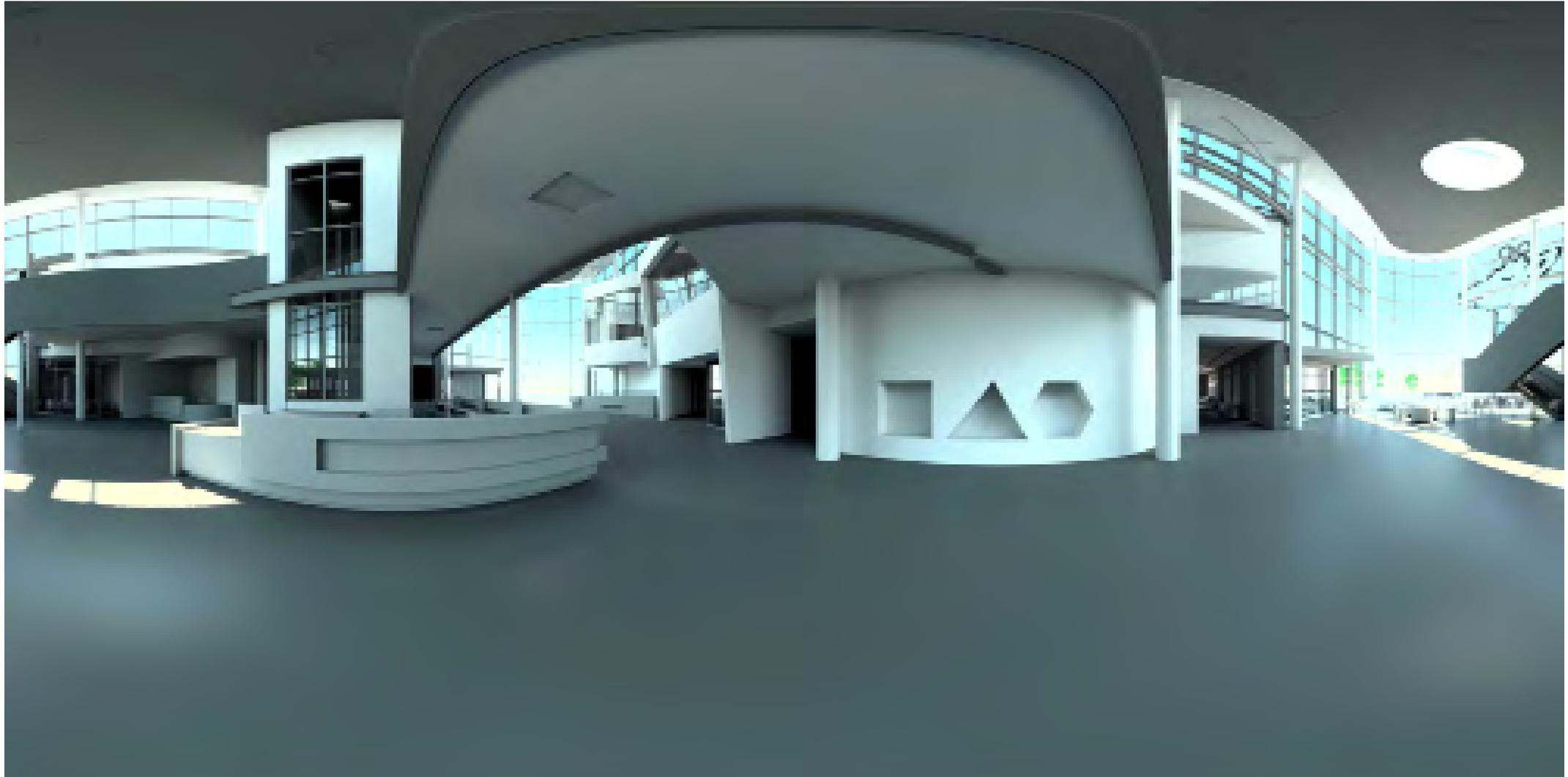
# Response Curves



# Exposure levels



# Exposure Sequence



Video

Radiance Conference  
08.23.2017

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# Dynamic Adaptation VRview (DEMO)



Video

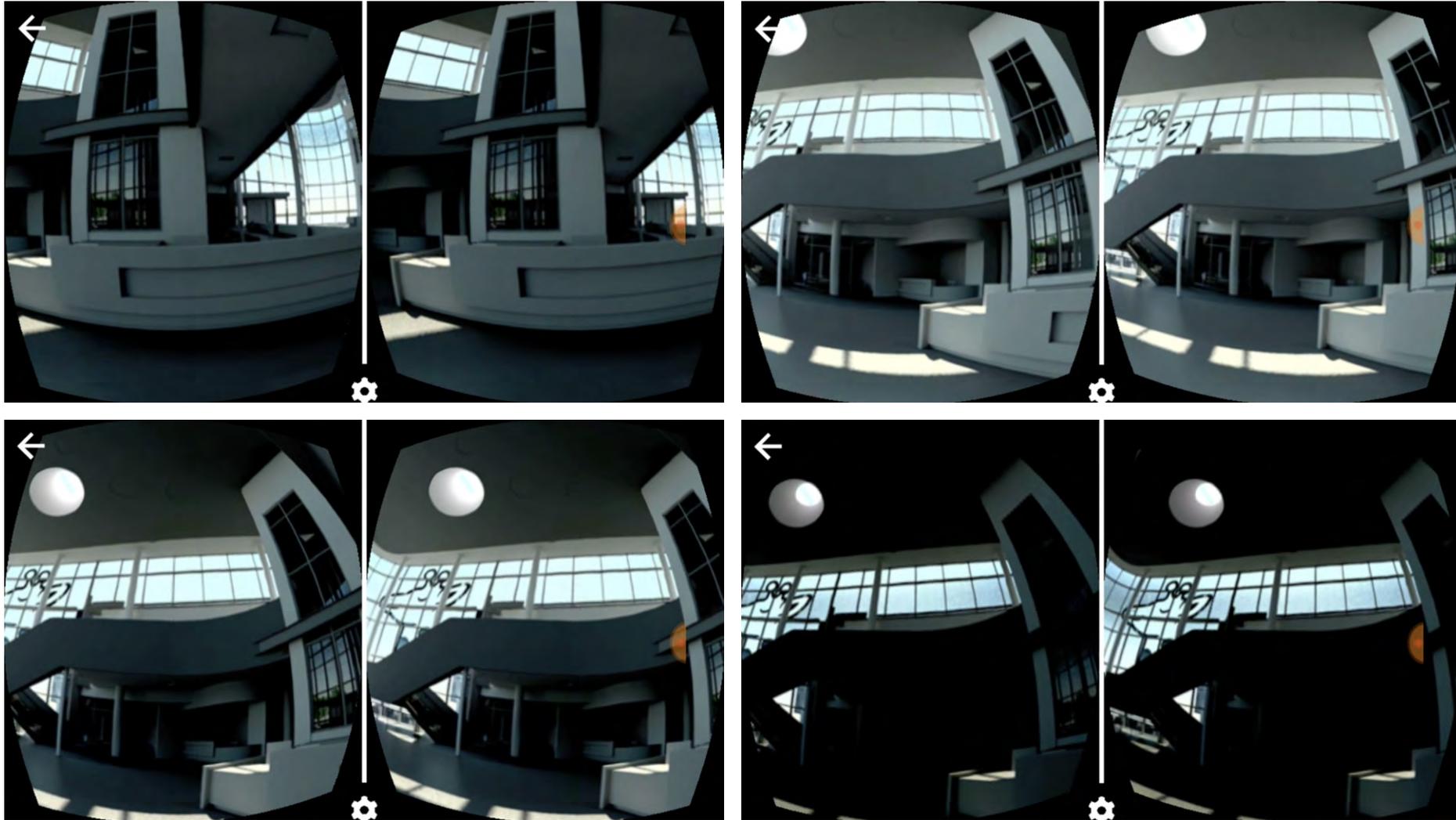
Issues with process so far:

- rendering transparency has high latency on mobile
- frequent crashing on mobile
- No clear path to accurate adaptation time
- Adaptation field of view seems too small.

SOLUTION:

- Preload textures
- Use enough exposure steps (determined by  $L = L_0 * \text{base}^{\text{exposure}}$ ) to smooth transitions
- create time delay dependent on # of exposure steps traveled

# Dynamic Adaptation VRview (DEMO)



## Next Steps

- more accurately model adaptation times (include slow adaptation model for higher contrast scenes)
- incorporate acuity/veiling/color visibility from pcond
- Increase hotspot density / better packing / non circular outlines.
- calculate adaptation with eye model and weight pixels by solid angle
- Check sensitivity of viewer adaptation, device brightness and contrast.
- validation?????

