# Perceptual, comfort and health aspects of natural lighting in a space

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Neugebauer house Richard Meier & Partners



High dynamic range (HDR) rendering



latitude 64.13° N





latitude 64.13° N





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latitude 64.13° N





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#### visual delight

## dynamic performance





#### visual delight

dynamic spatial and temporal performance



![](_page_11_Picture_3.jpeg)

![](_page_12_Figure_0.jpeg)

![](_page_12_Picture_1.jpeg)

#### responsive comfort

![](_page_13_Figure_1.jpeg)

![](_page_13_Picture_2.jpeg)

#### responsive comfort

![](_page_14_Figure_1.jpeg)

![](_page_14_Picture_2.jpeg)

#### responsive comfort

#### responsive comfort

• predicting gaze responses (avoidance or attraction) as a function of glare input

![](_page_15_Figure_3.jpeg)

![](_page_15_Picture_4.jpeg)

![](_page_16_Figure_0.jpeg)

![](_page_16_Picture_1.jpeg)

## health potential

![](_page_17_Figure_1.jpeg)

**(**)4

#### health potential

#### factors

- intensity
- wavelength
- duration
- timing
- history

![](_page_18_Figure_7.jpeg)

![](_page_18_Figure_8.jpeg)

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ÉCOLE POLYTECHNIQUE

FÉDÉRALE DE LAUSANNE

#### health potential

#### dynamic model

![](_page_19_Figure_2.jpeg)

![](_page_19_Picture_3.jpeg)

![](_page_20_Figure_0.jpeg)

![](_page_20_Picture_1.jpeg)

#### december 21st

![](_page_21_Figure_1.jpeg)

![](_page_21_Figure_2.jpeg)

![](_page_21_Figure_3.jpeg)

#### june 21st

![](_page_21_Figure_5.jpeg)

![](_page_21_Figure_6.jpeg)

![](_page_21_Figure_7.jpeg)

![](_page_21_Picture_8.jpeg)

## evaluating daylight performance

temporal vs. spatial / annual vs. instantaneous

![](_page_22_Picture_2.jpeg)

![](_page_22_Picture_3.jpeg)

![](_page_22_Figure_4.jpeg)

![](_page_22_Figure_5.jpeg)

![](_page_22_Picture_6.jpeg)

#### evaluating daylight performance

temporal vs. spatial / annual vs. instantaneous / absolute vs. goal-based

![](_page_23_Figure_2.jpeg)

![](_page_23_Picture_3.jpeg)

## EPFL | LIPID | Interdisciplinary Laboratory of Performance-Integrated Design

![](_page_24_Picture_1.jpeg)

http://lipid.epfl.ch/

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![](_page_24_Picture_6.jpeg)

Fonds national suisse Schweizerischer Nationalfonds Fondo nazionale svizzero Swiss National Science Foundation

![](_page_24_Picture_8.jpeg)

![](_page_24_Picture_9.jpeg)