

# CASE STUDY- ARUP

## WHAT LIGHTING DESIGNERS NEED TO KNOW



**NEW DESIGN METRICS**

**BIOLOGICAL POTENCY OF LIGHT OR LIGHTING**

**PHOTORECEPTOR RESPONSES OR MELANOPSYN SUPPRESSION**

**ADAPTATION OF LIGHT RESPONSES**

# NEW DESIGN METRICS

What are the variables we can learn and adopt from nature through day to night?

## **Beneficial to well-being**

- Organic pattern to the light
- Uniformity/ spatial aspects
- Smoothness of light transition (temporal pattern)
- Minimum beneficial dose (intensity & duration)

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Element #4 **Colour and light**—colour, light and material qualities, and space relationships to nature

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26 Composition

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27 Communication

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28 Preference

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29 Engagement

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30 Pragmatics

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31 Natural light

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32 Filtered light

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33 Reflected light

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34 Light pools

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35 Warm light

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36 Light as shape and form

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37 Spaciousness

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38 Spatial variety

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39 Space as shape and form

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40 Spatial harmony

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## BIOPHILIC INTERIOR DESIGN ELEMENTS

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# Organic pattern of light

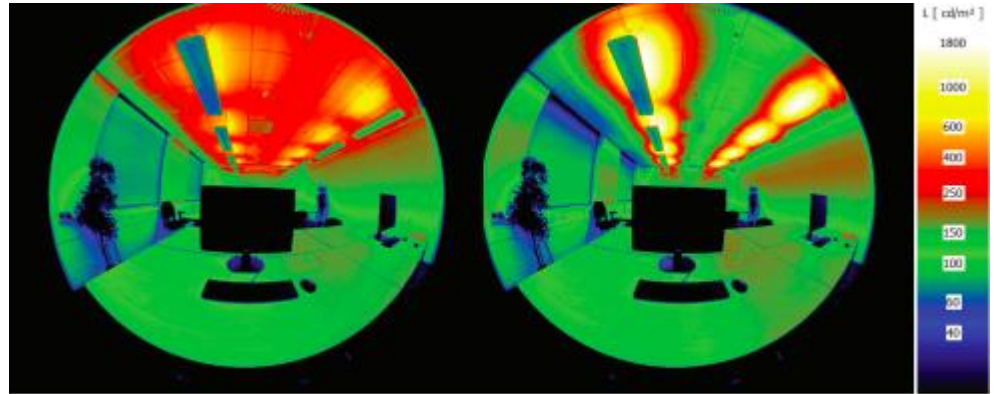


- Biophilic design looks at colour, light, materiality in design
- Attributes such as colour preference was most frequently identified theme
- Biophilic design are linked with improved health and well-being

(McGee & Park, 2022)

# Uniformity and spatial arrangement

- More pleasant (de Vries et al., 2021)
- More perceived illuminance (de Vries et al., 2021)
- Increased feelings of safety (Peña-García et al., 2015)
- Wall illuminance is also important, not only ceilings (de Vries et al., 2018)



De Vries et al. (2021)

# Smooth light transition

- Sudden and abrupt light transitions are not perceived as comfortable or pleasant. (Kompier et al. 2022)
- Naturalistic and dynamic light transition is associated with color chroma and hue (Kong et al., 2019)



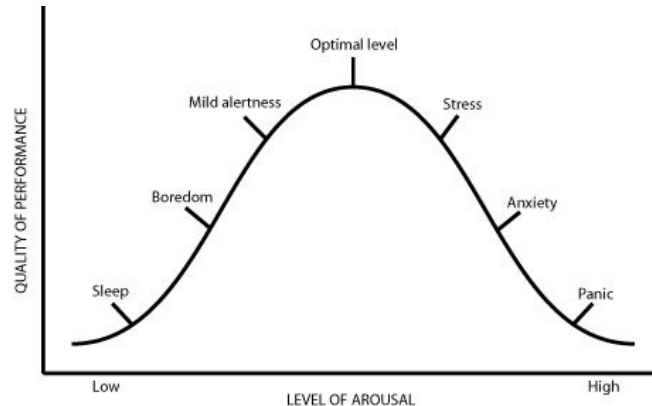
# Dose of light and Mean light timing above threshold

- Dose of light in naturalistic environment is difficult to determine, but needs to be considered (Smolders et al., 2018)
- Mean light timing above threshold: duration index (Peeters, et al. 2022)



# Important things to consider

- Comfort is not unidimensional: thermal comfort
- Perception of light: individual dependant (Zhang et al., 2016)
- Individual preference in lighting design (color, intensity)
- Circadian aspects are important, not only for biology
- Cultural determinants are relevant
- Social interaction through face detection is also important to consider
- Light illuminance and correlated color temperature affect mood (Lan et al. 2021)





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