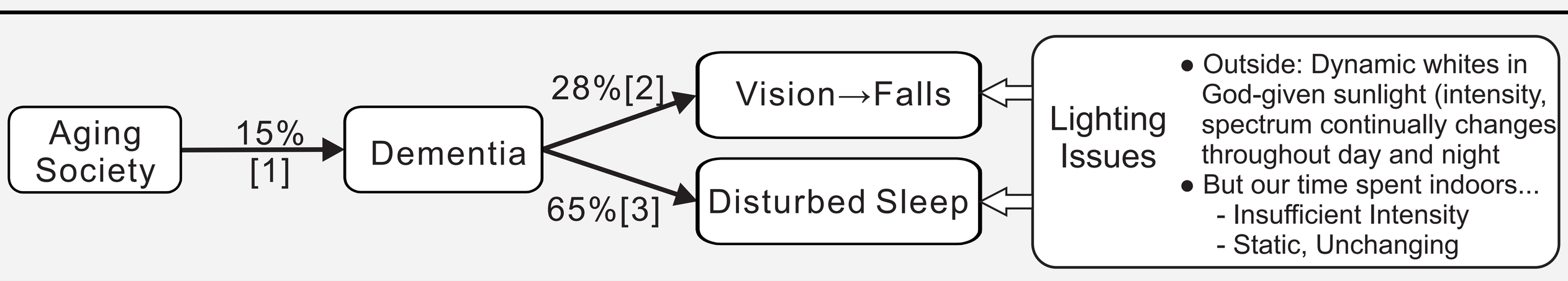
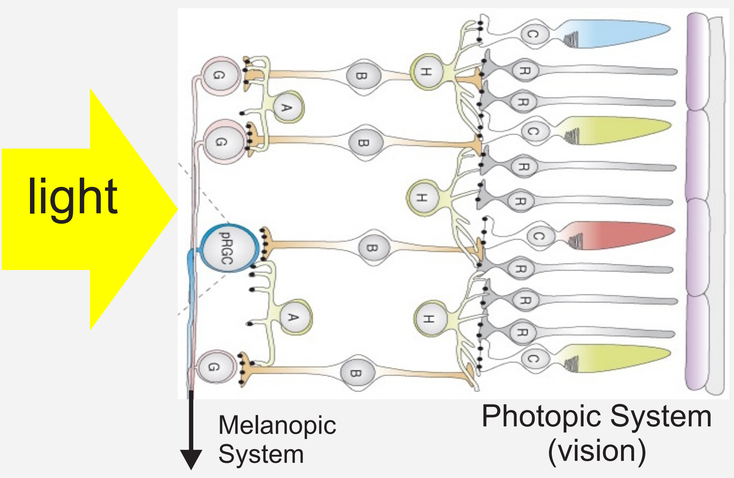
# Dynamic Whites Light to Aid Sleep and Vision for Persons Living with Dementia

Charity Grace White, Jonathon David White, Yuan Ze University, Taiwan whitejd@saturn.yzu.edu.tw

RESSAM GARDENS
MEMORY CARE COMMUNITY

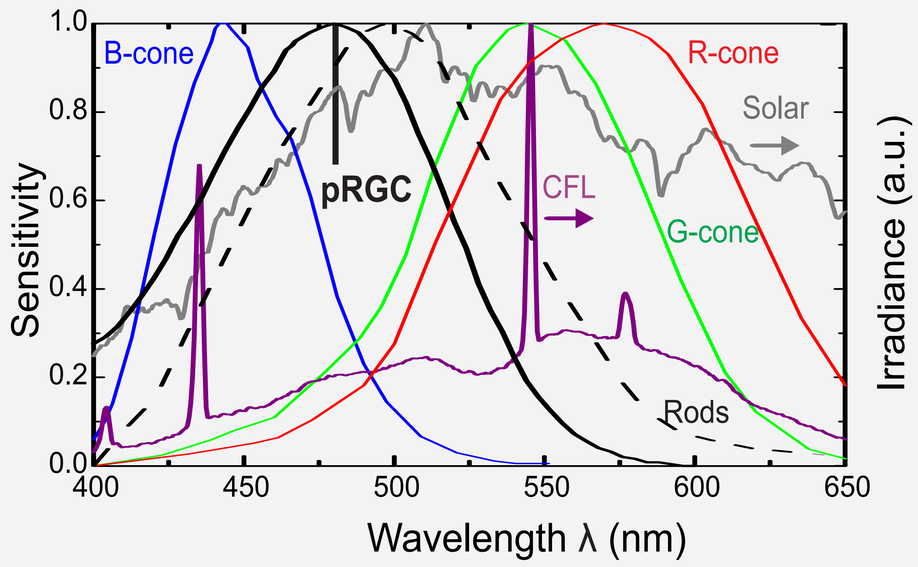



## Light & Our Eyes: Not Just for Seeing




1. Cones: let us see colour during day
   Blue, Green, Red
2. Rods: let us see grey at night
3. pRGC Cells (don't see, new)
   → melatonin (melanopic system)
   → sleep → our body clock [4]

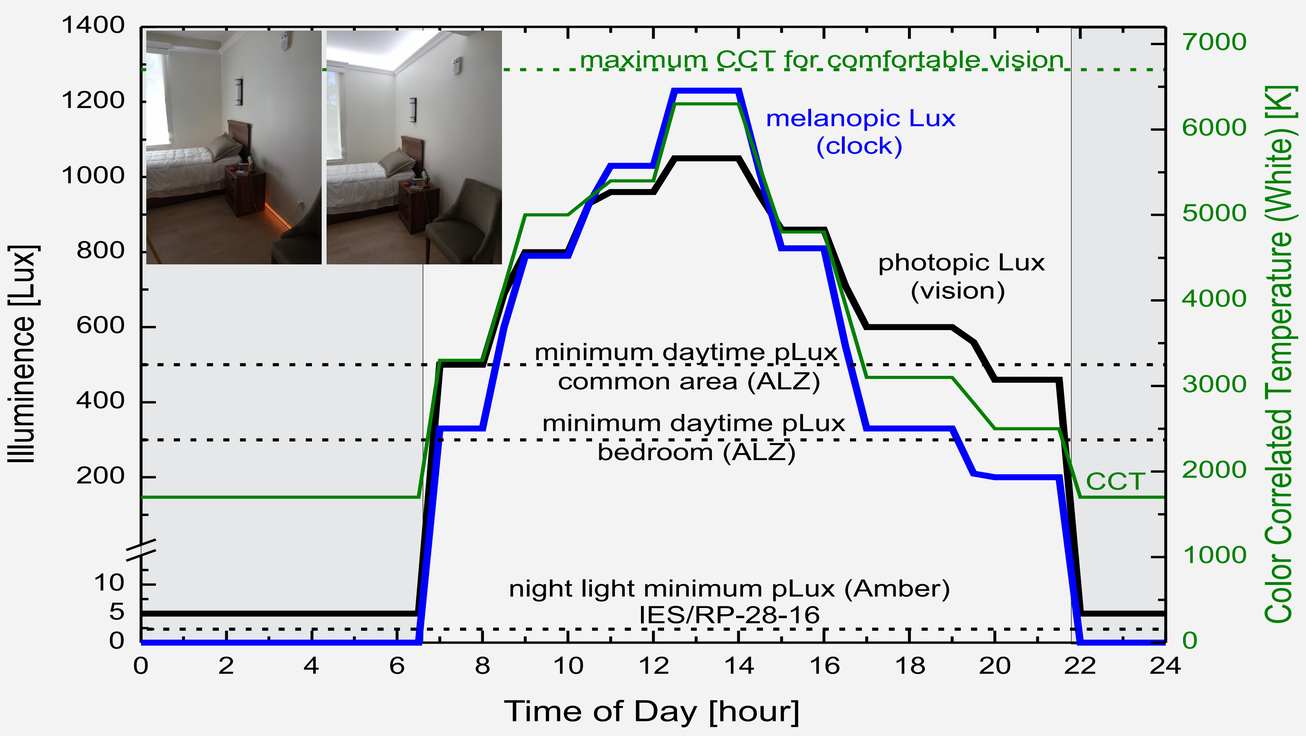
● Each system sensitive to different λ

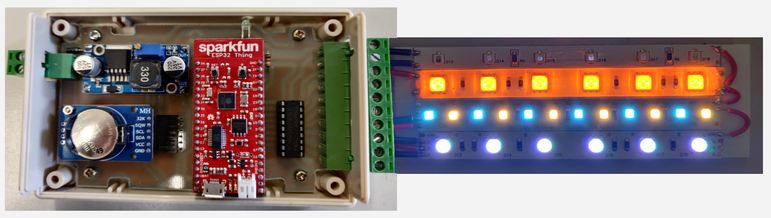


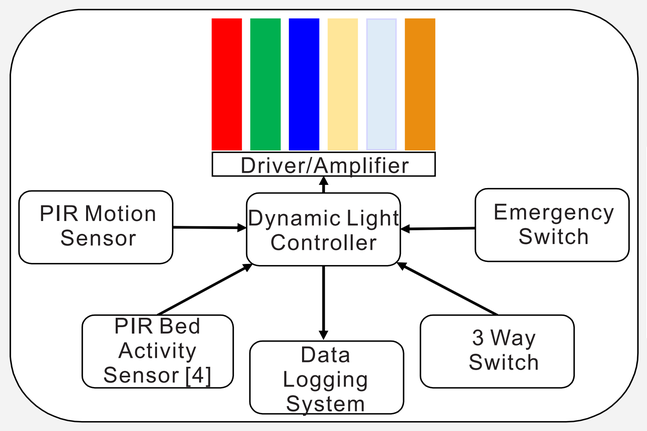

## Improving Lighting

| System | Conventional | Healthy: White Like Sunlight | Ressam Gardens |
|---|---|---|---|
| Vision | direct → glare/shadows → falls | multiple sources, indirect lighting → glare↓, shadows↓ → falls↓ | LED strip lighting in coves/baseboard provides even indirect light throughout the room |
| Vision & Clock | Insufficient intensity (200~300 pLux) | Sufficient to see clearly and keep awake (500 to 1000 Lux) | |
| Clock | Static (unchanging) → no indication of time | Dynamic (Intensity & Spectrum) → Indication of Time | Computer Control of Intensity, Spectrum |
| Clock | Incorrect wavelengths for melatonin suppression | Intensity at 480nm: Morning High, Evening Moderate, Night None | 6 types of LEDs emitting at different wavelengths |

## Healthy and Safe Lighting System






## References, Support, Further Study

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2. A. Hanford (2013), J Alzheimer's Disease 33, 913
3. M. Hankins (2008), Trends in Neurosciences 31, 27
4. Ellen van Lieshout-van Dal(2019), Building and Environment,150, 245-253
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