

Light and colour





[NASA]









Spectral Power Distribution (SPD)



metameric spectrum (Wandell 4.11)











Single cone response











Tristimulus colour theory

Surface reflectance



How light and reflectance become cone responses (Wandell, 9.2)

 $\int C(\lambda) R(\lambda) I(\lambda) d\lambda$









Meaghan Sims (achromatopsia)

Constant Gen 1911 on Diam 24.9 (19 Concetta Antico is the only tetrachromat artist, meaning that she has a fourth color receptor, allowing her to see 100 million colors, compared to 1 million in the average human. This gift brings a whole new dimension to Concetta's landscape paintings, as well as her seascapes and night skies.



Concetta Antico (tetrachromacy)

Colour perception

- Dogs: 1
- Marine mammals: 1
- Primates:
 - Old world: 3
 - New world: males 2, females 2 or 3
- Bees: 3 (but ultraviolet instead of red)
- Fish and birds: 4–5
- Butterflies: 6



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COLOUR I sees it





Written and drawn by The Oatmeal

Colour perception





















CMY











(cylindrical coordinates!)







CIE XYZ

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