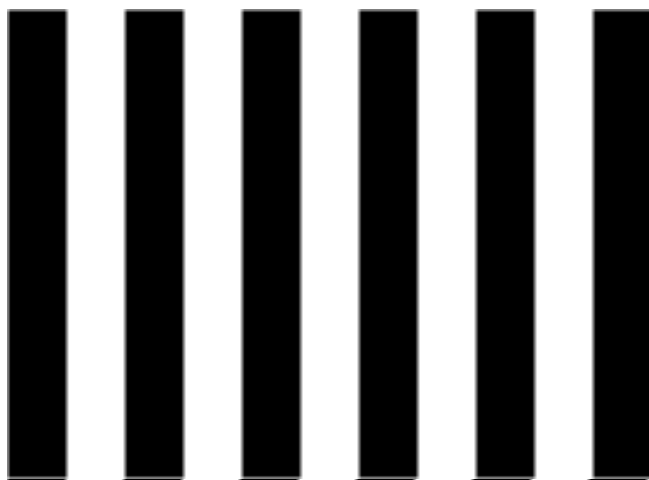


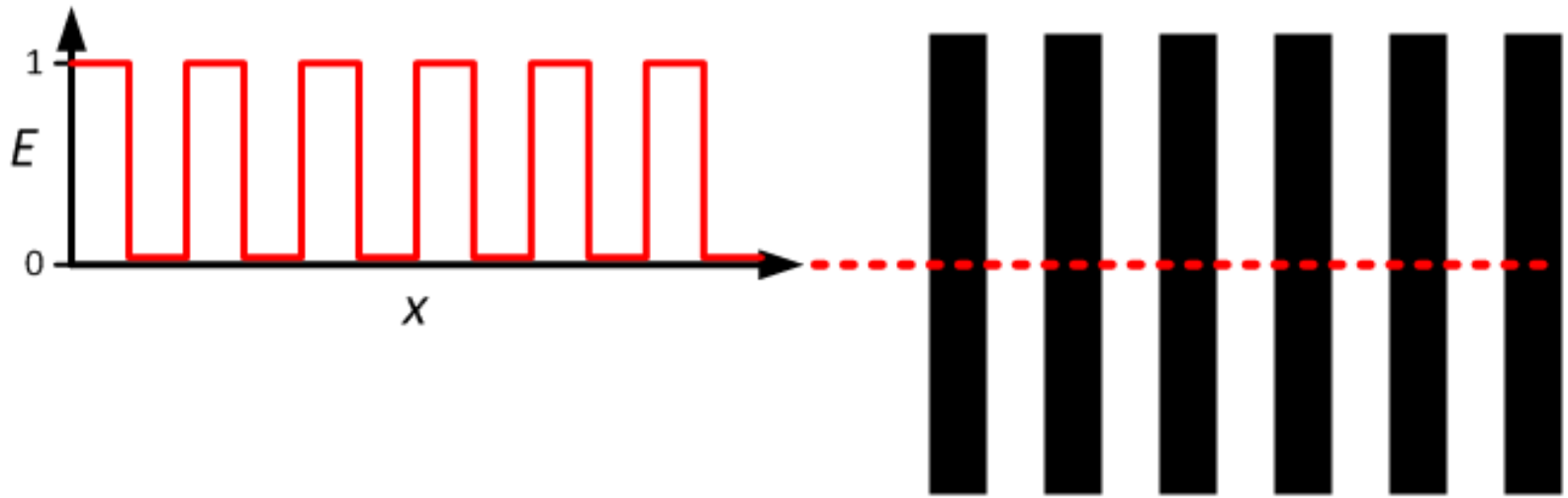
# **Assessing Color Rendering Without Test Samples**

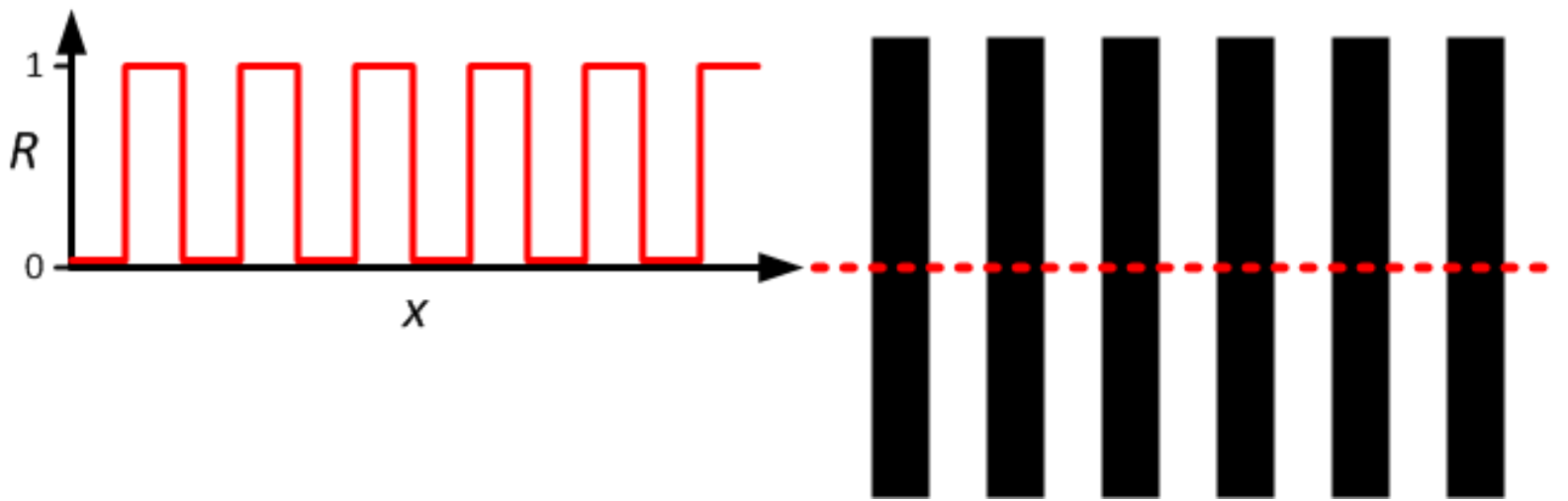
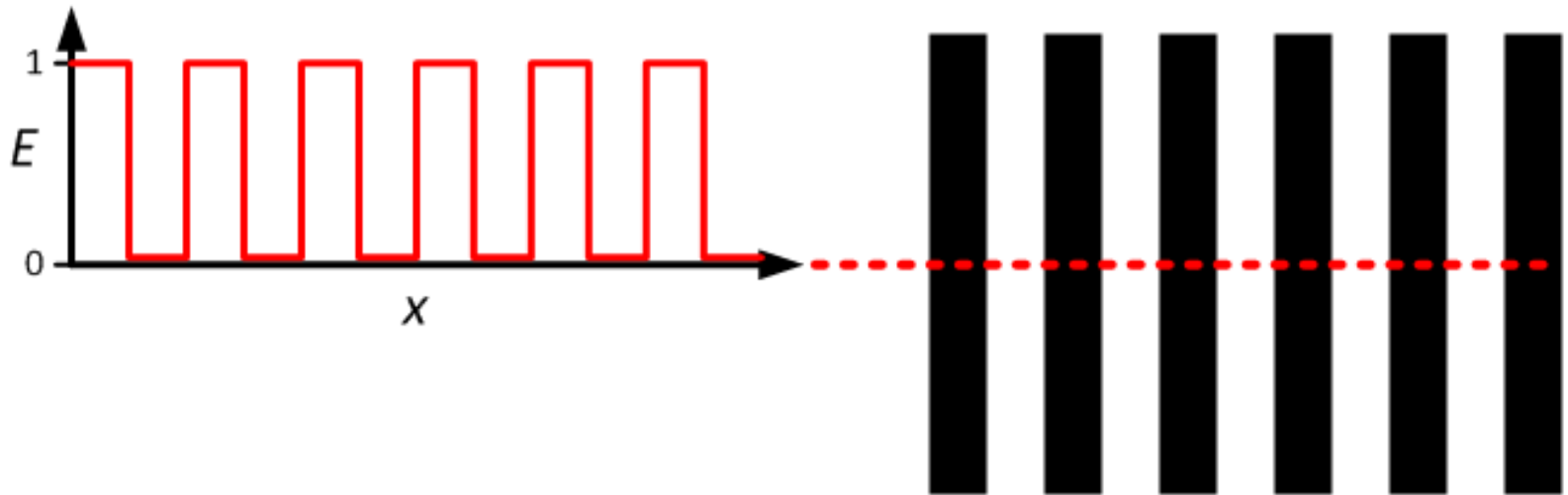
Lorne Whitehead

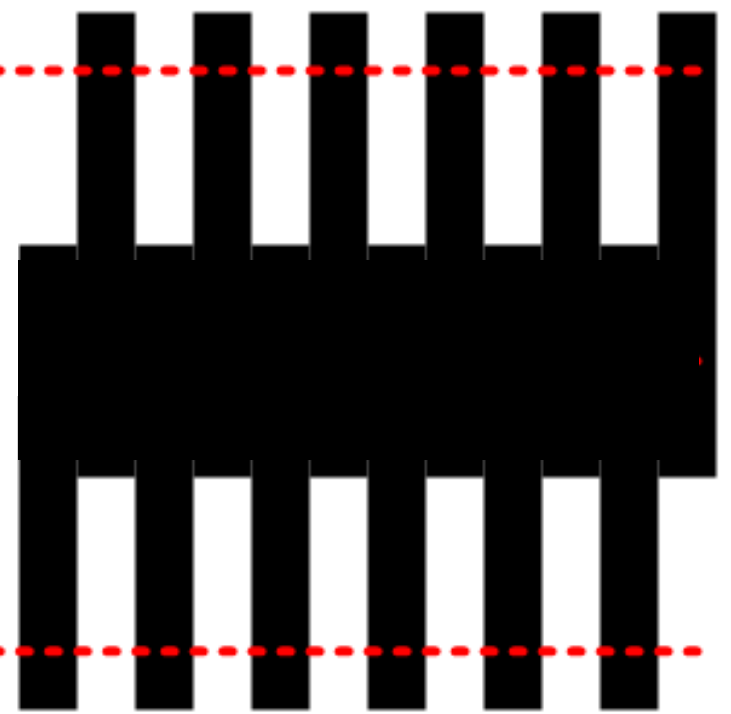
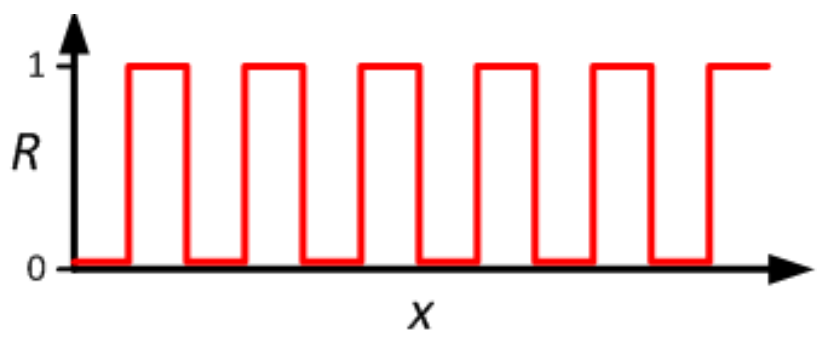
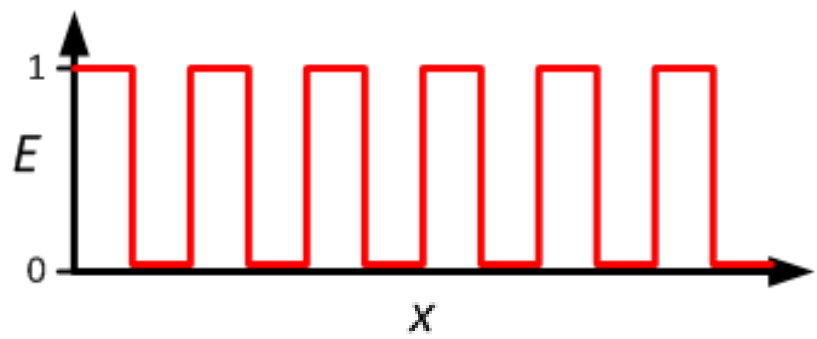
University of British Columbia

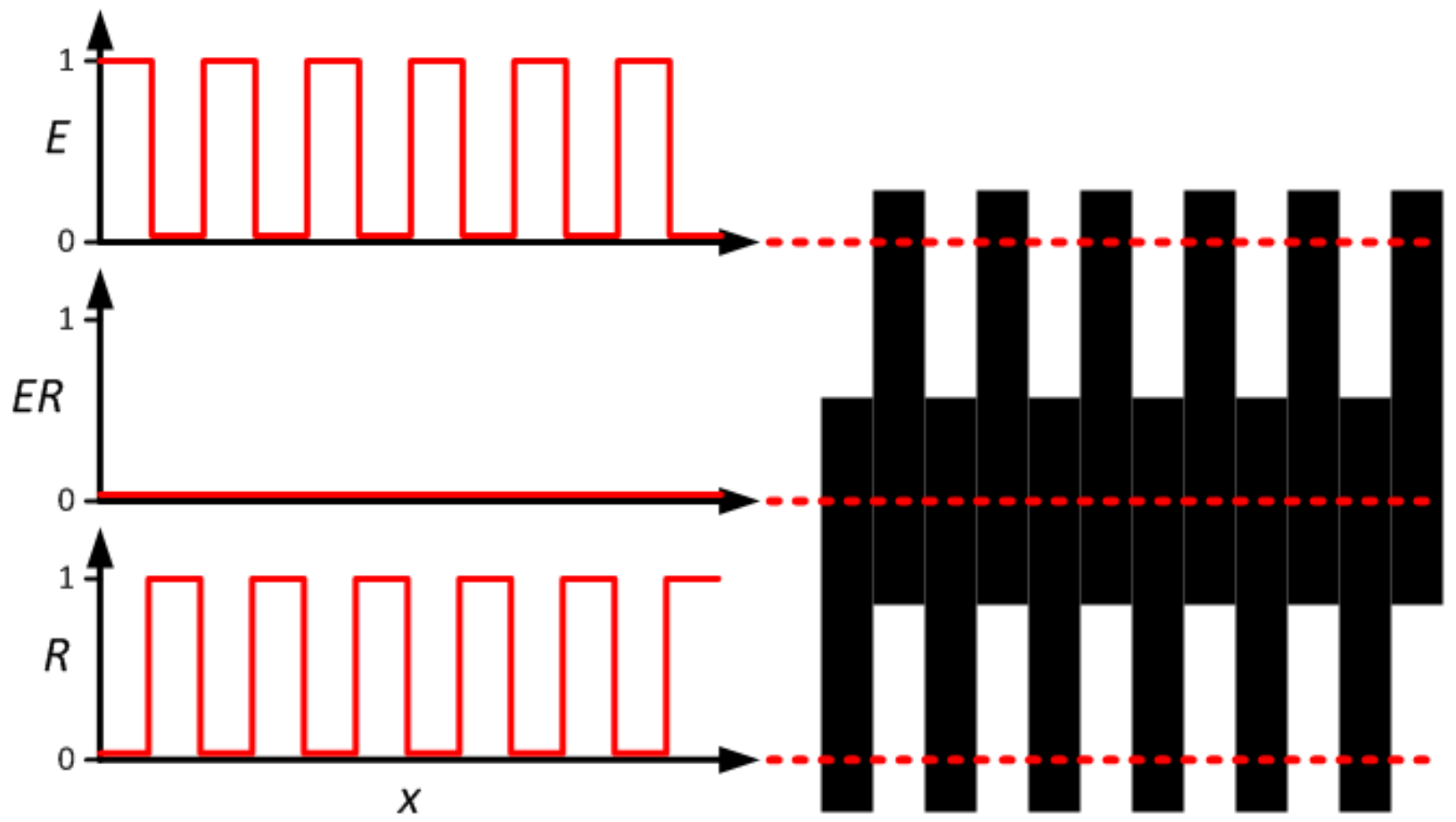
June 18, 2014

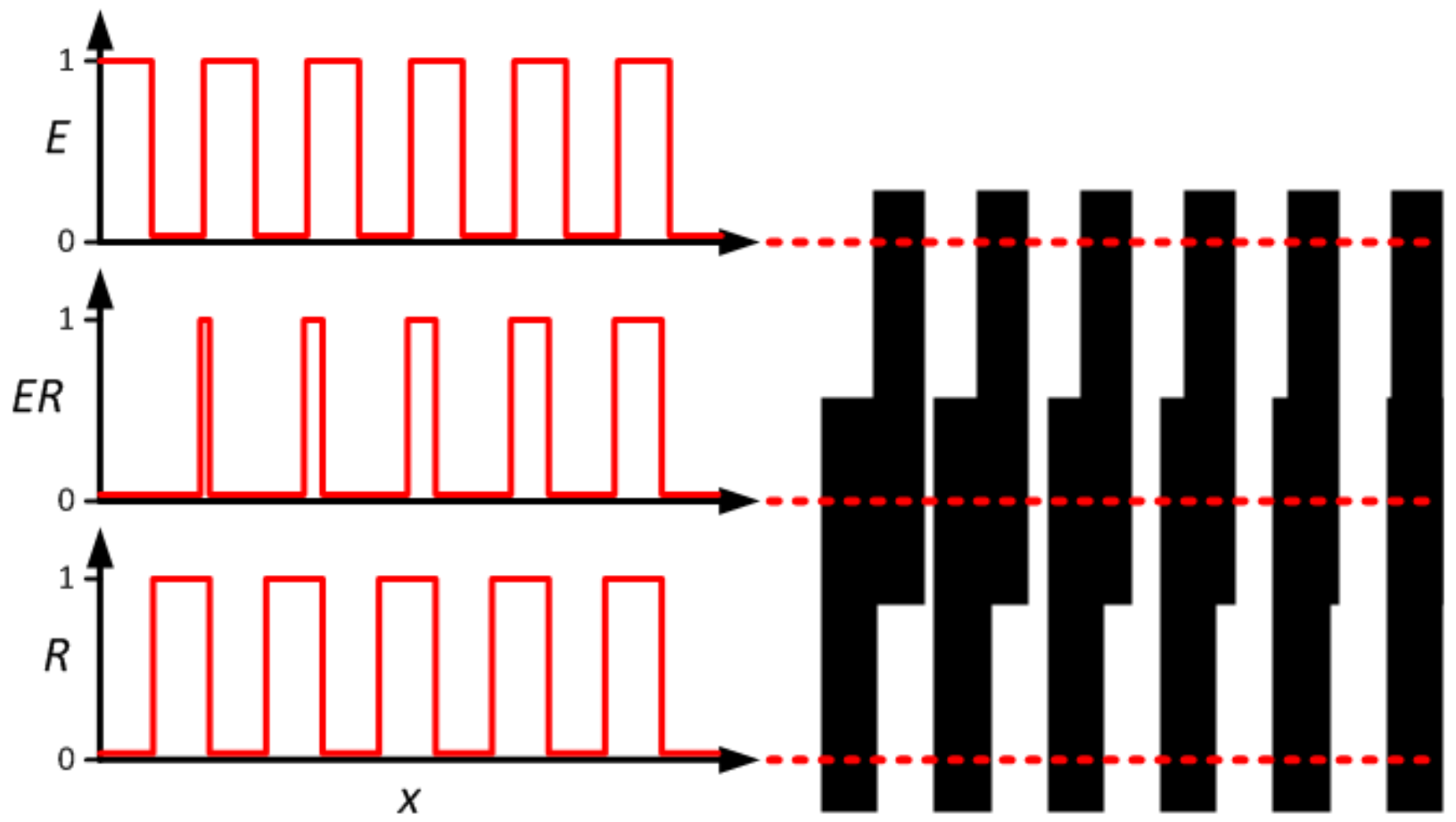


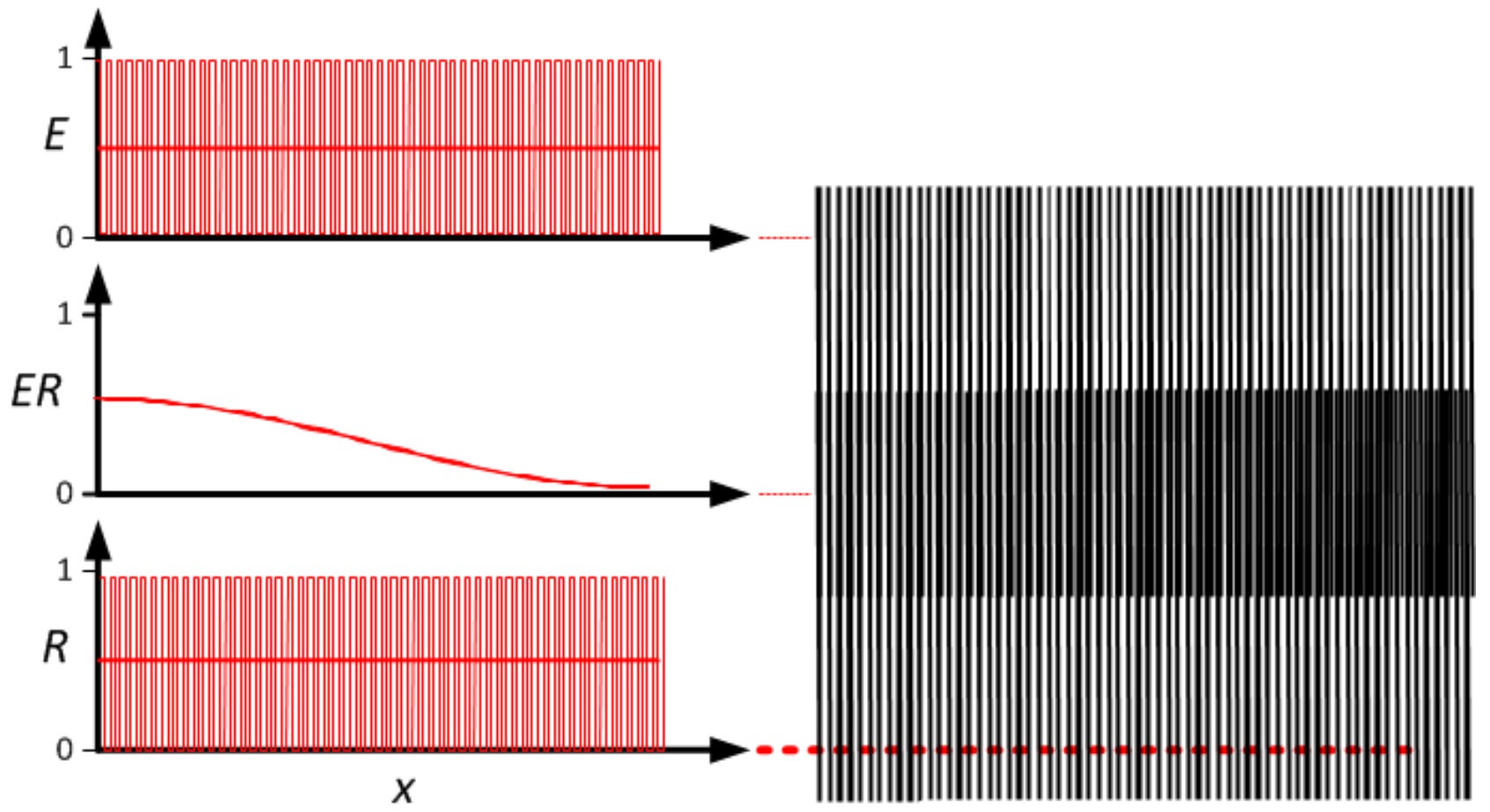




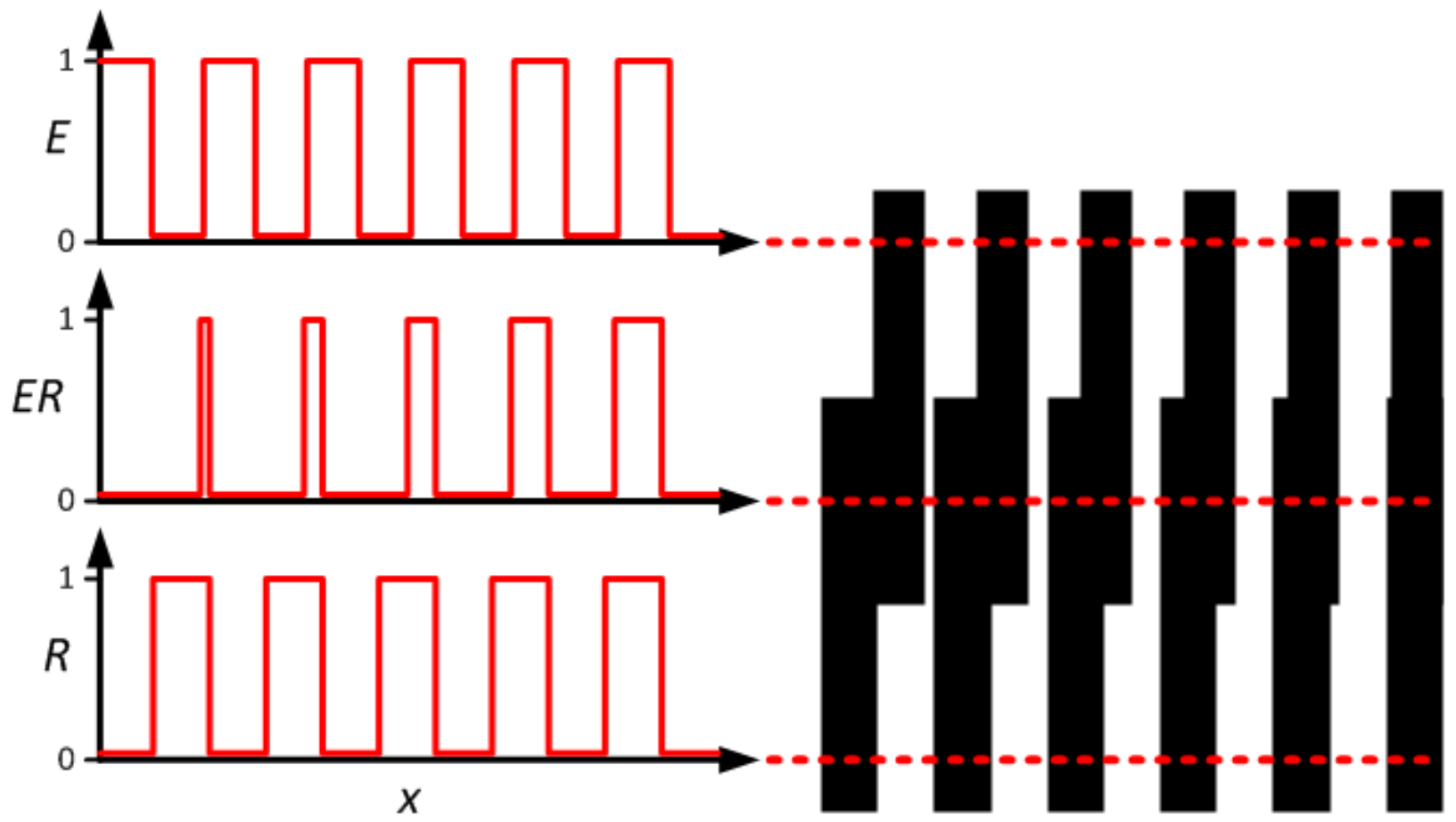


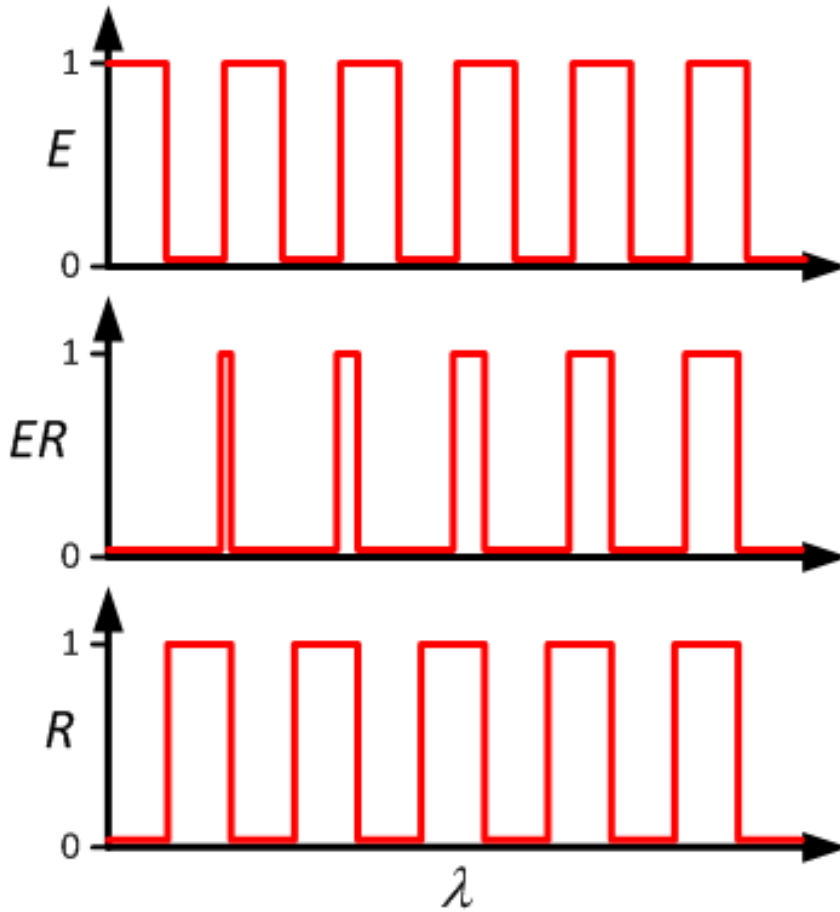








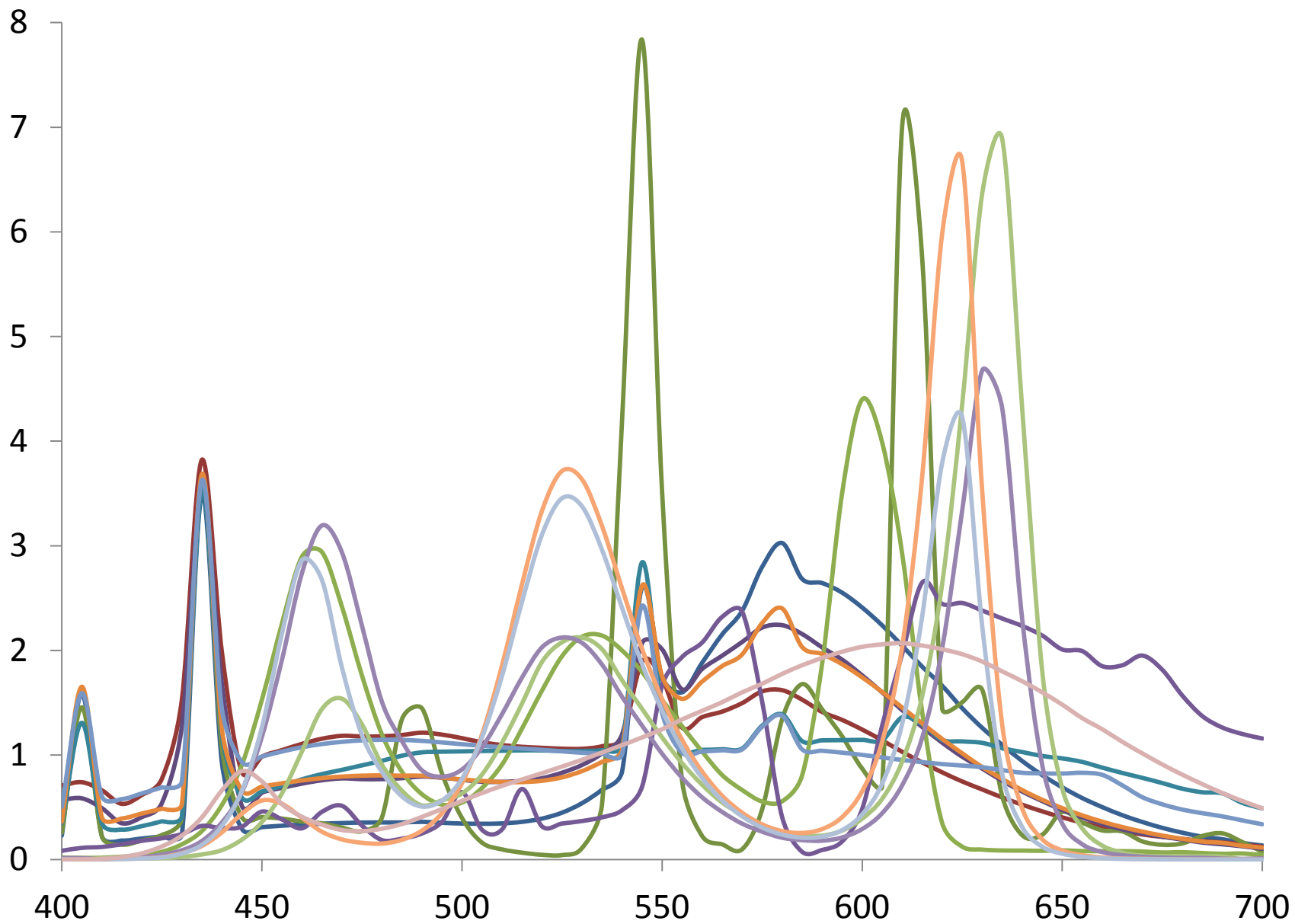


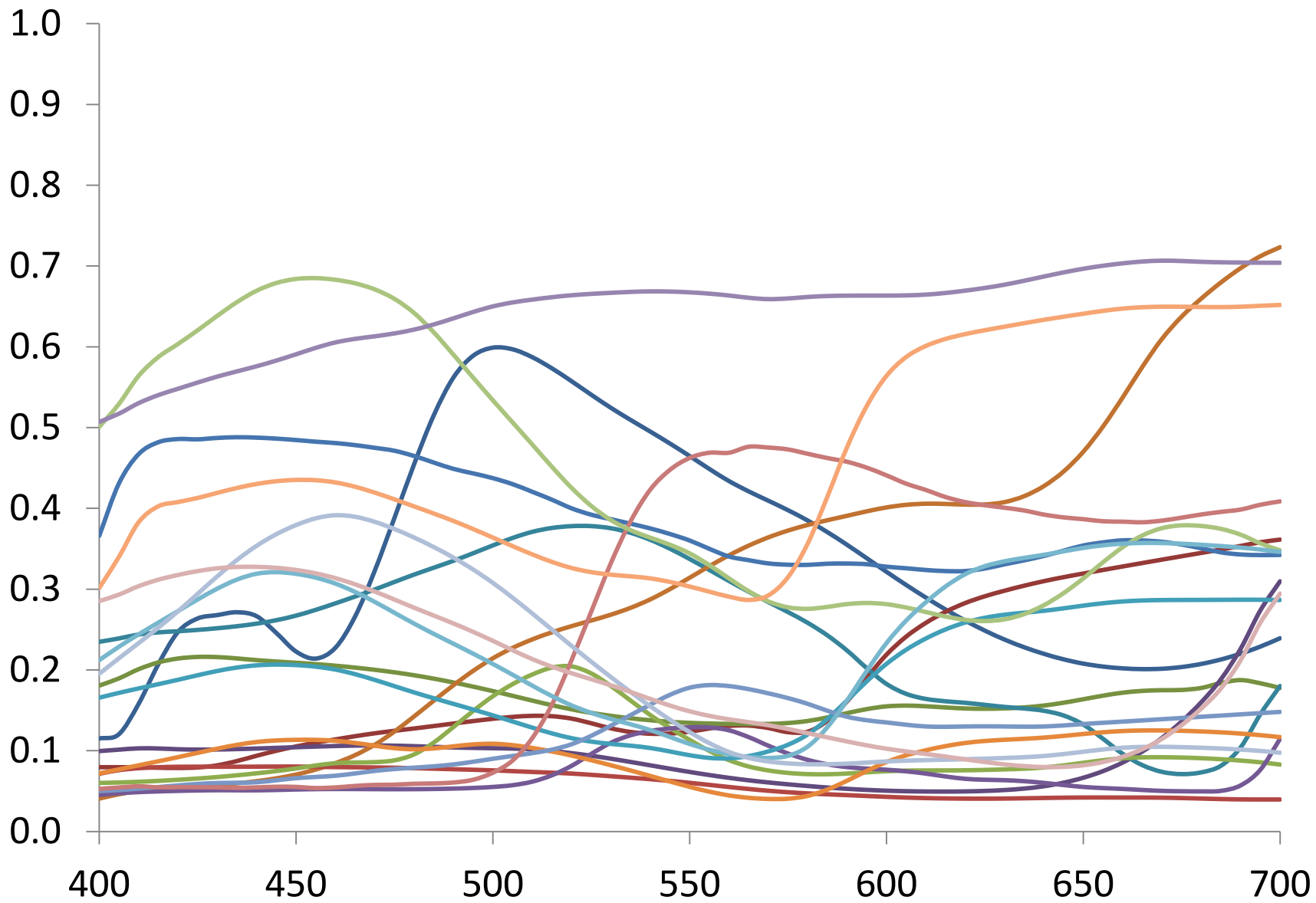


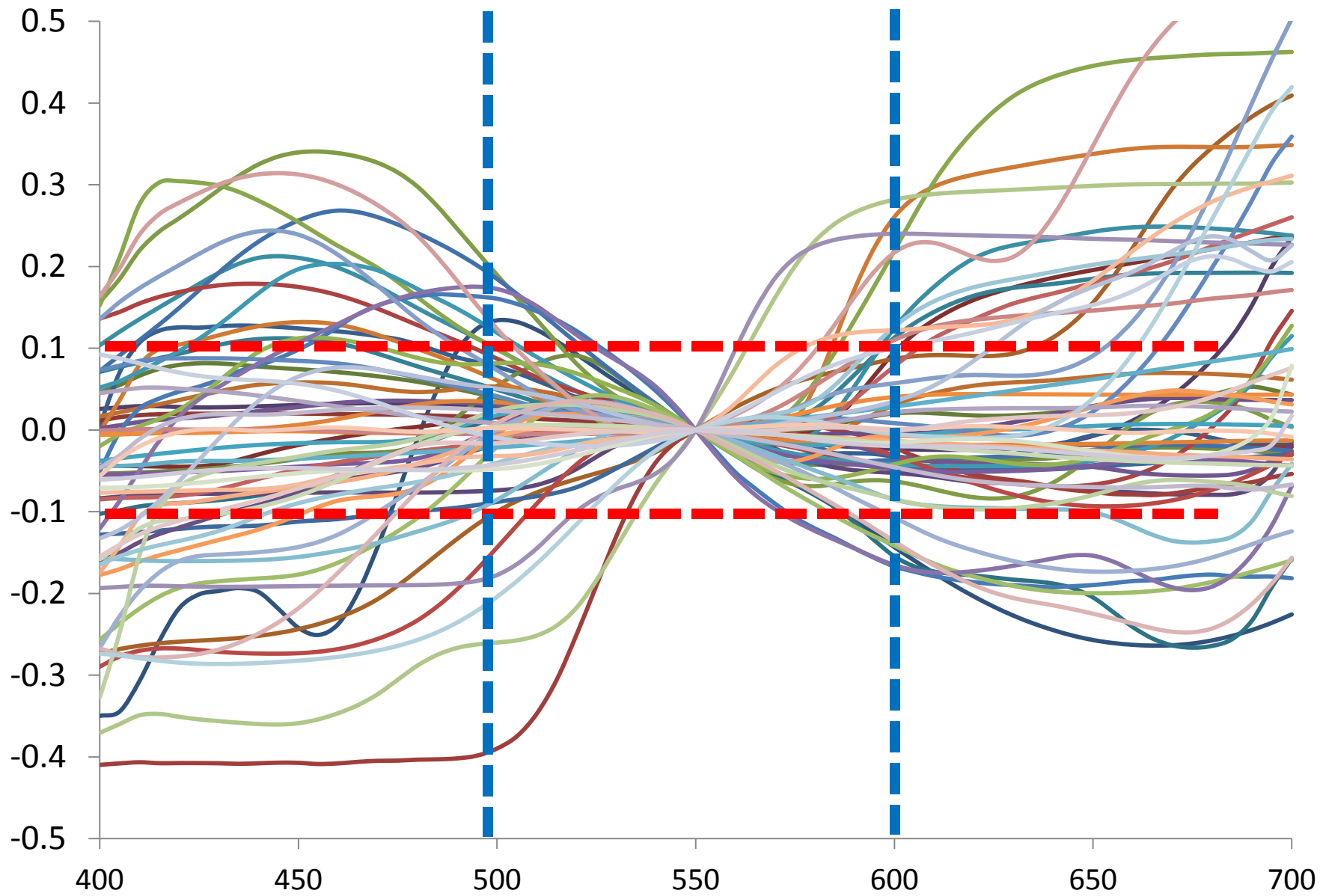
“white” light

**orange reflection!**

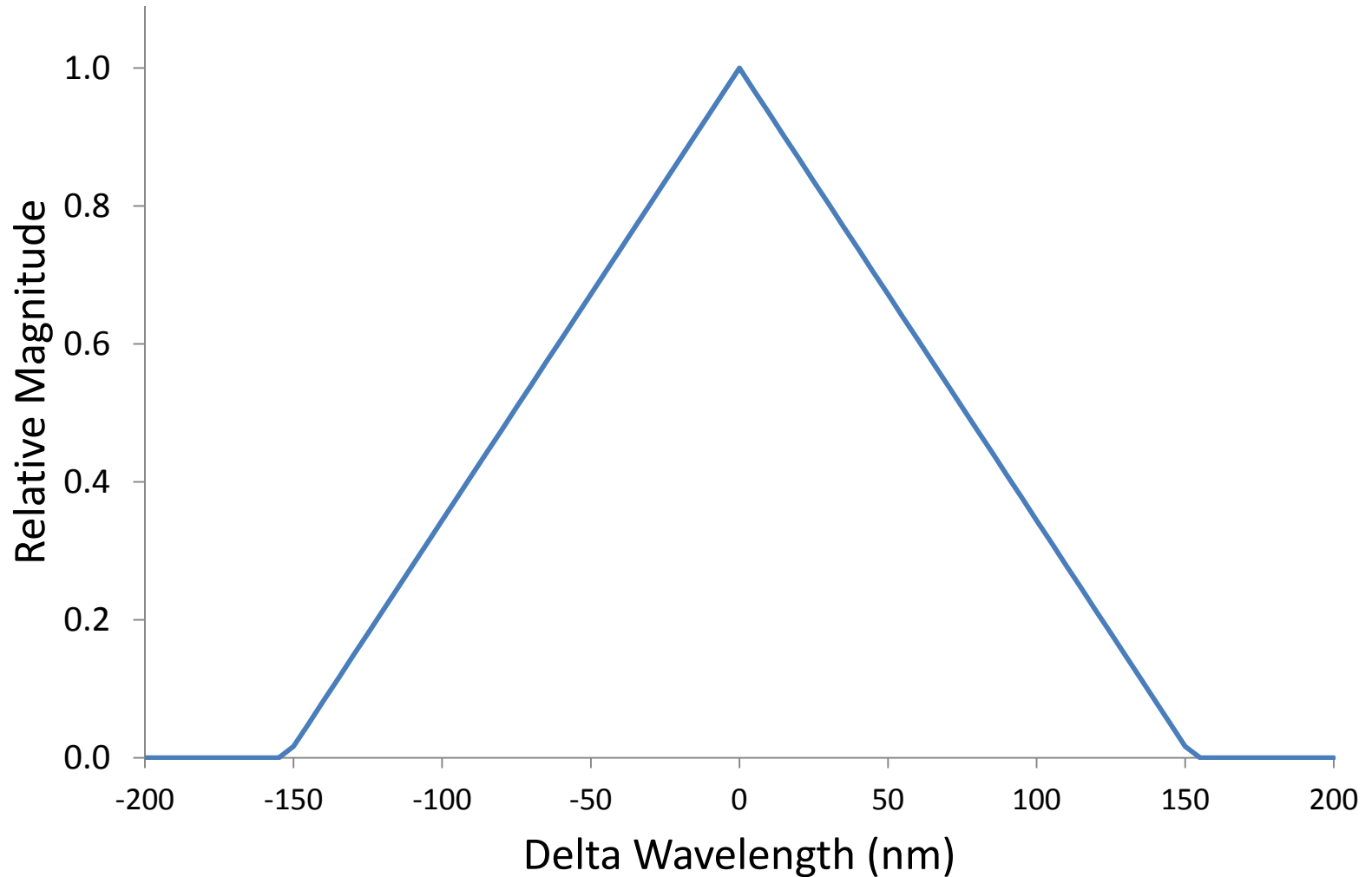
“gray” surface



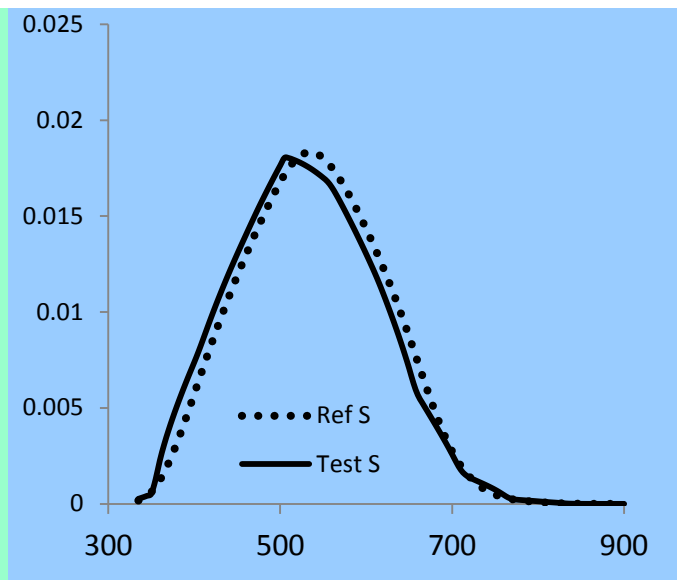
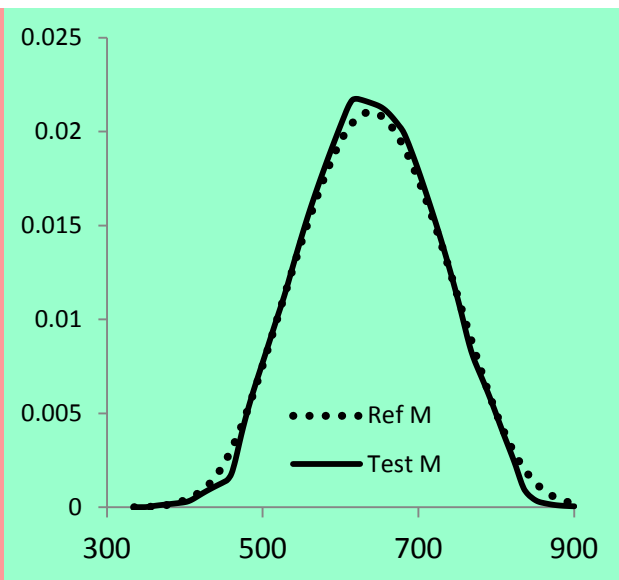
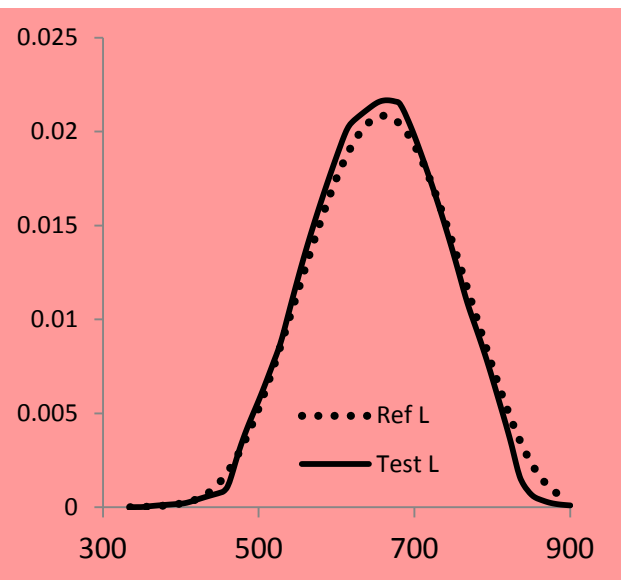
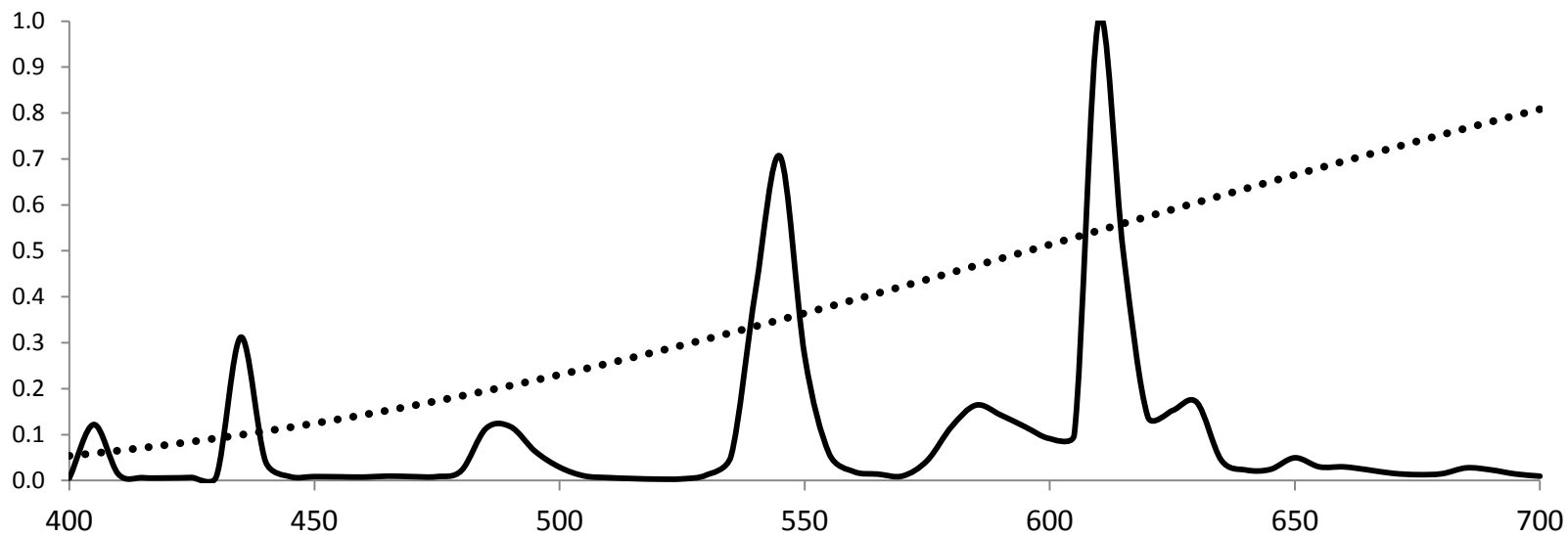




# Spectral Blurring Function



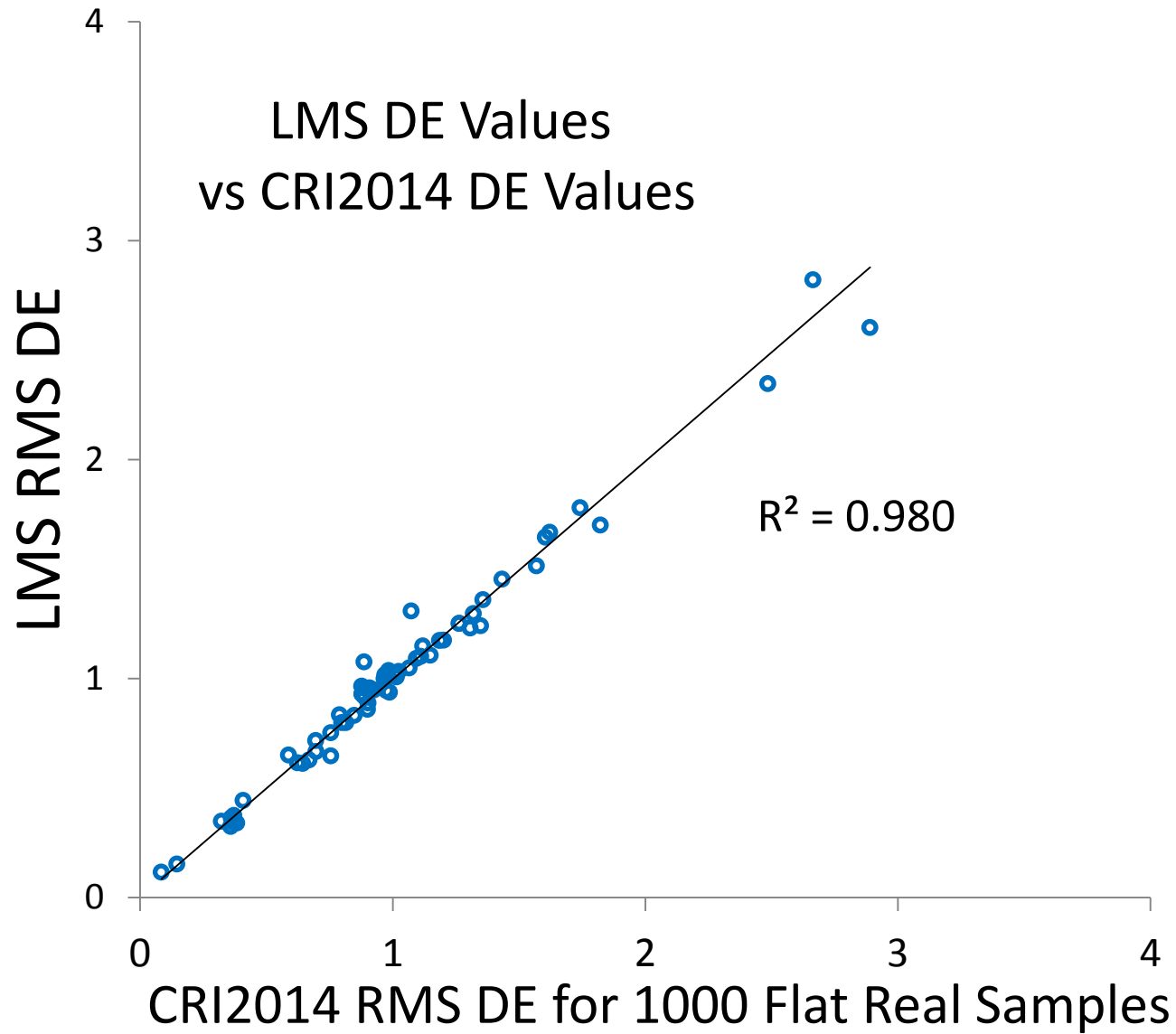
$$\begin{aligned}L'_t(\lambda) &= n_{L,t} \left[ (L(\lambda) E_t(\lambda)) * B(\lambda) \right]^c \\M'_t(\lambda) &= n_{M,t} \left[ (M(\lambda) E_t(\lambda)) * B(\lambda) \right]^c \\S'_t(\lambda) &= n_{S,t} \left[ (S(\lambda) E_t(\lambda)) * B(\lambda) \right]^c \\L'_r(\lambda) &= n_{L,r} \left[ (L(\lambda) E_r(\lambda)) * B(\lambda) \right]^c \\M'_r(\lambda) &= n_{M,r} \left[ (M(\lambda) E_r(\lambda)) * B(\lambda) \right]^c \\S'_r(\lambda) &= n_{S,r} \left[ (S(\lambda) E_r(\lambda)) * B(\lambda) \right]^c\end{aligned}$$





$$\begin{pmatrix} \Delta a(\lambda) \\ \Delta b(\lambda) \\ \Delta j(\lambda) \end{pmatrix} = \begin{bmatrix} g_{aL}, & g_{aM}, & g_{aS} \\ g_{bL}, & g_{bM}, & g_{bS} \\ g_{jL}, & g_{jM}, & g_{jS} \end{bmatrix} \begin{pmatrix} L'_t(\lambda) - L'_r(\lambda) \\ M'_t(\lambda) - M'_r(\lambda) \\ S'_t(\lambda) - S'_r(\lambda) \end{pmatrix}$$

$$\Delta E = \sqrt{\int \left( (\Delta a(\lambda))^2 + (\Delta b(\lambda))^2 + (\Delta j(\lambda))^2 \right) d\lambda}$$



# **Assessing Color Rendering Without Test Samples**

Lorne Whitehead

University of British Columbia

June 18, 2014