# Modeling the Retinal Ganglion Cells RFs considering the eye's imaging

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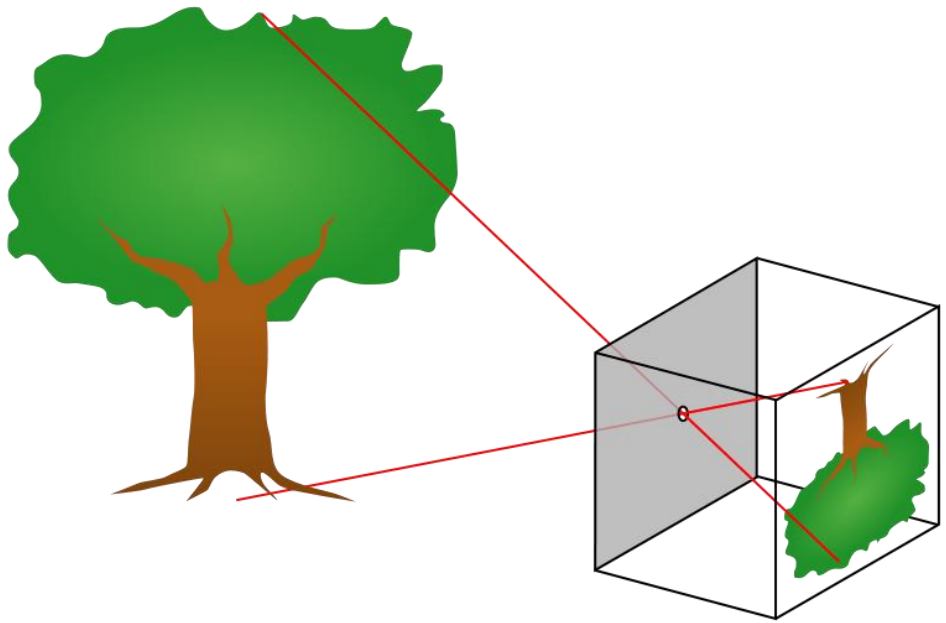
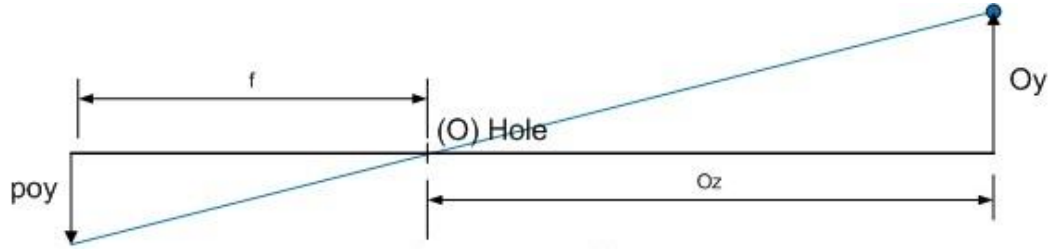
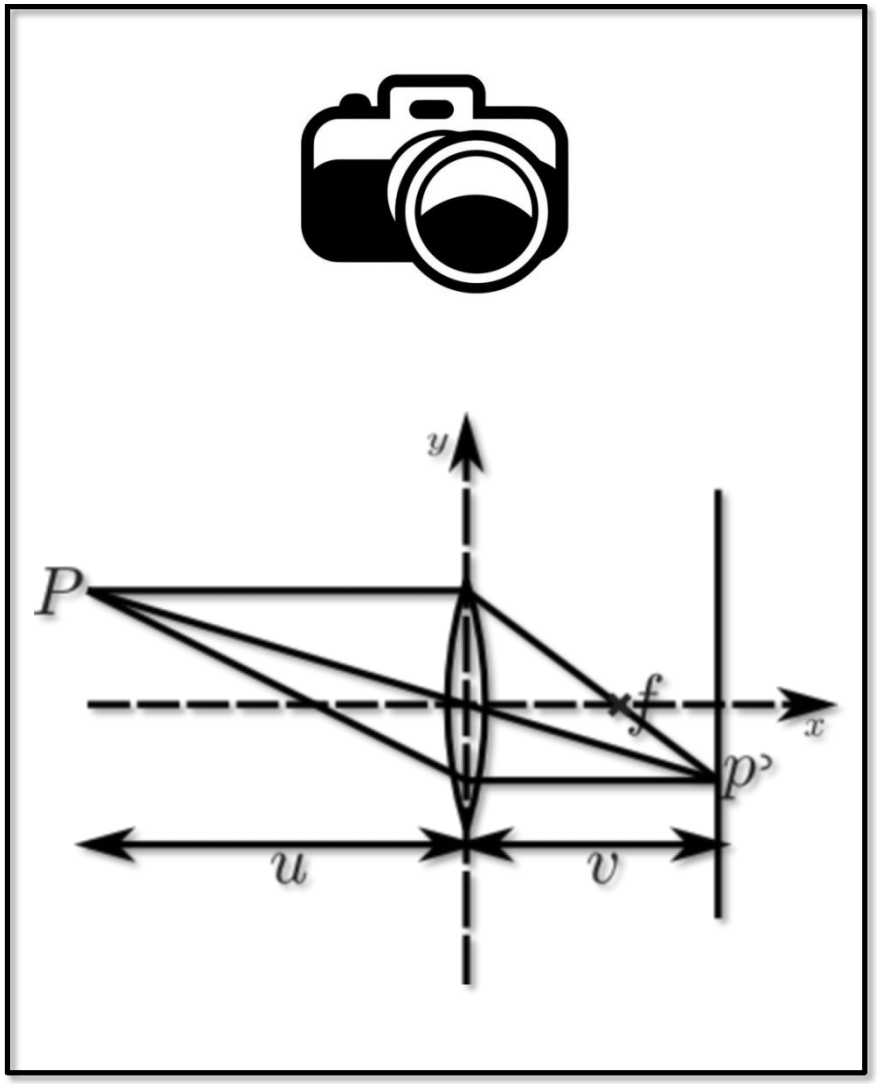
- The natural input and its statistics
- Modeling RGCs RFs across the visual field
- Comparing experimental and modeling results

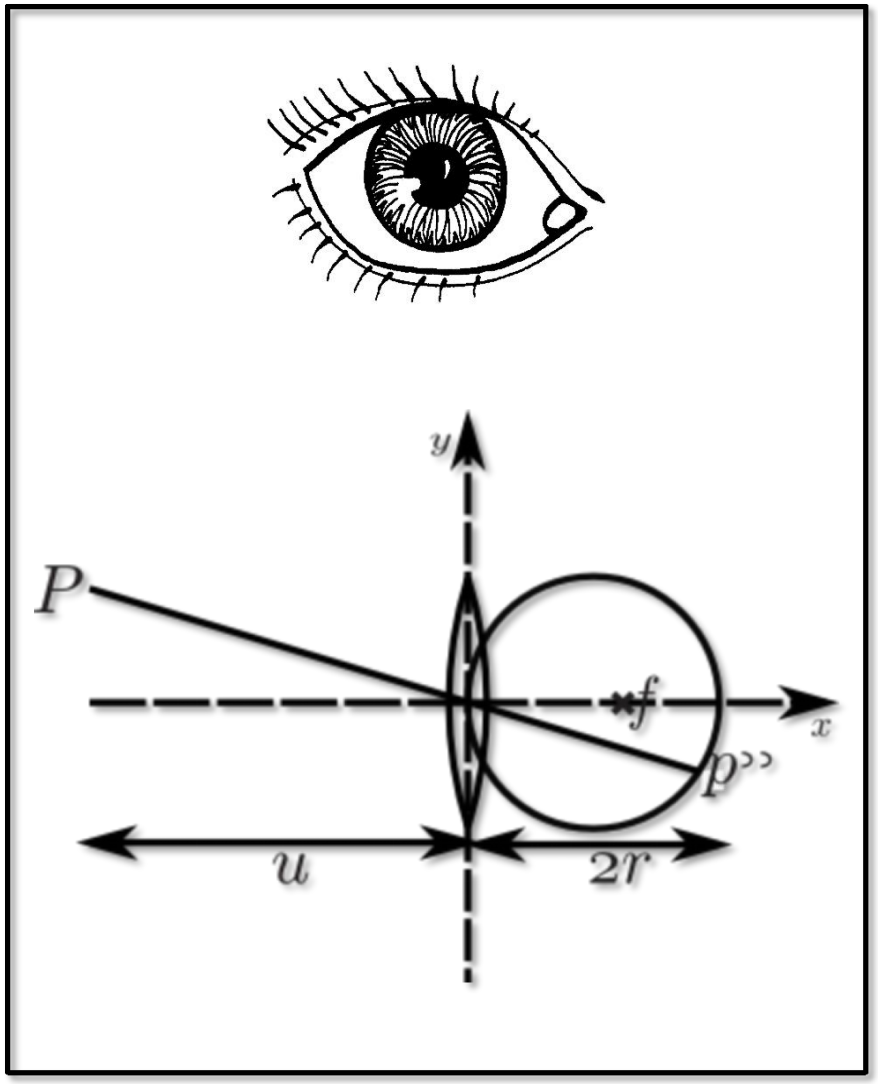
# Pinhole camera model





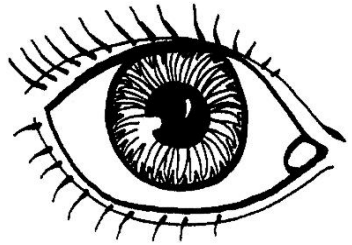
# Eyes Are Not Cameras: Imaging Process

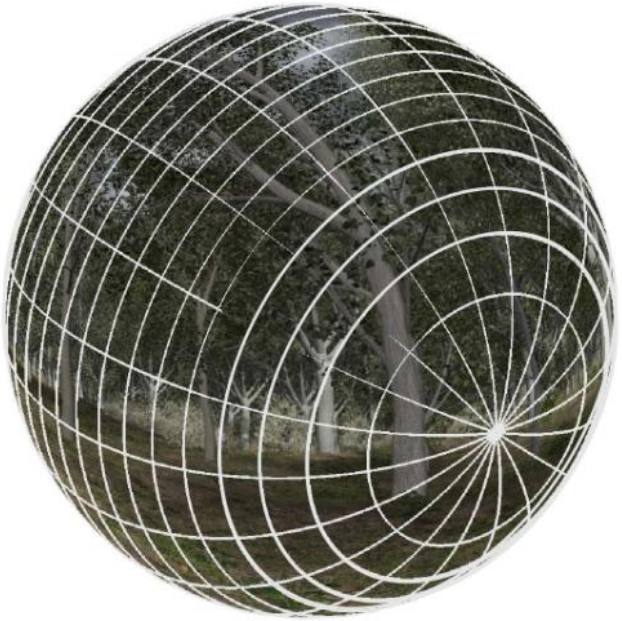


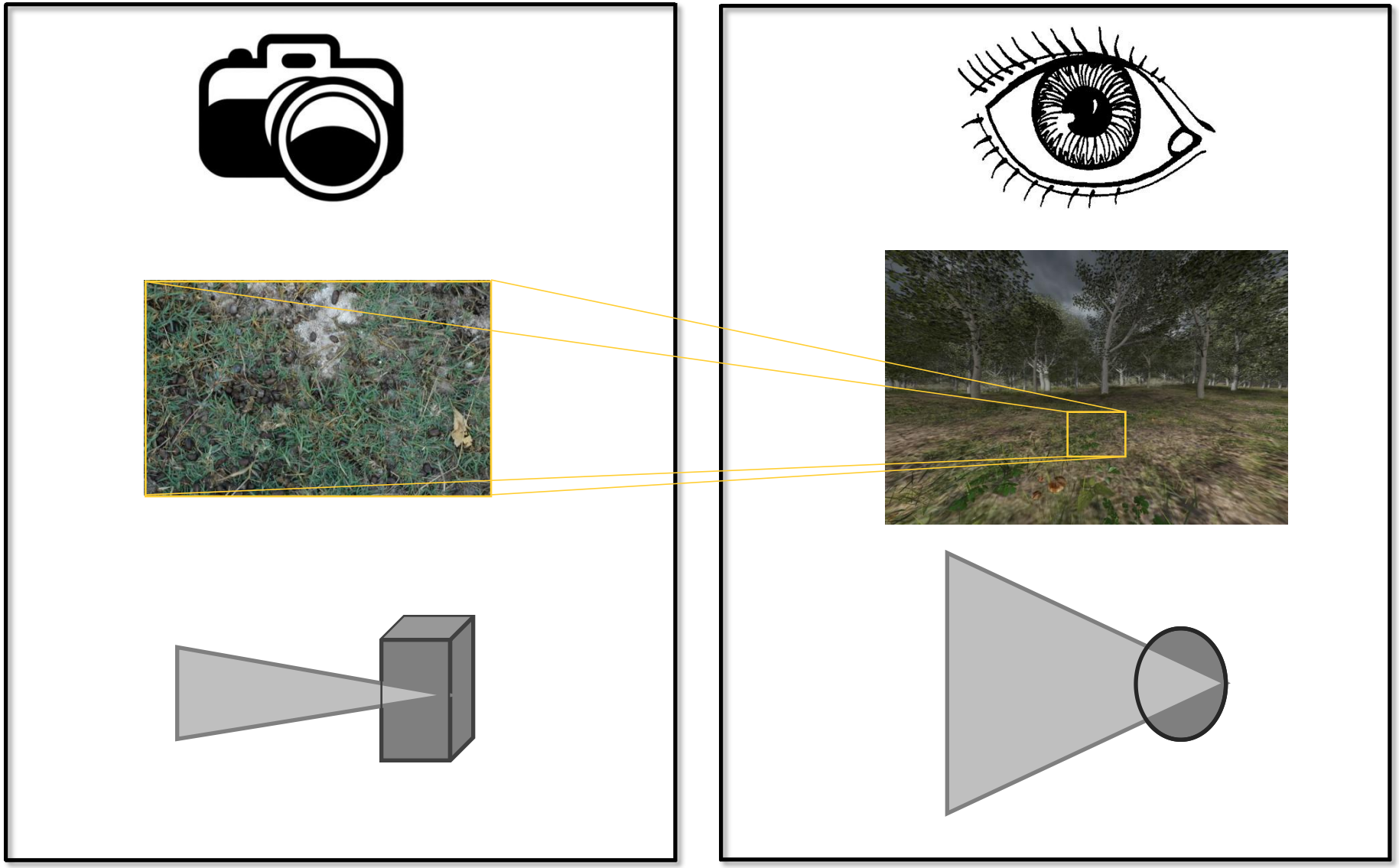

Hecht, 2001; Helmholtz, 1855

# Eyes Are Not Cameras: Visual Input



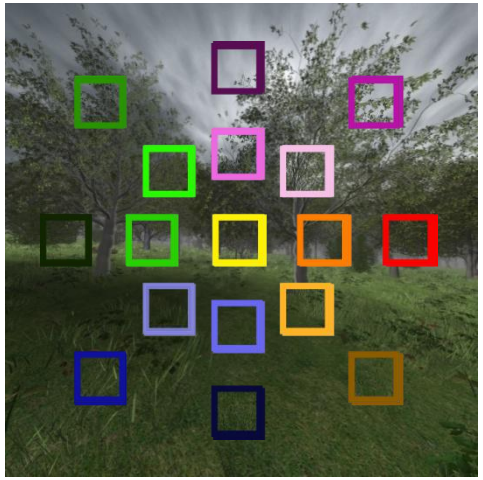


# Eyes are not cameras: Fields of view

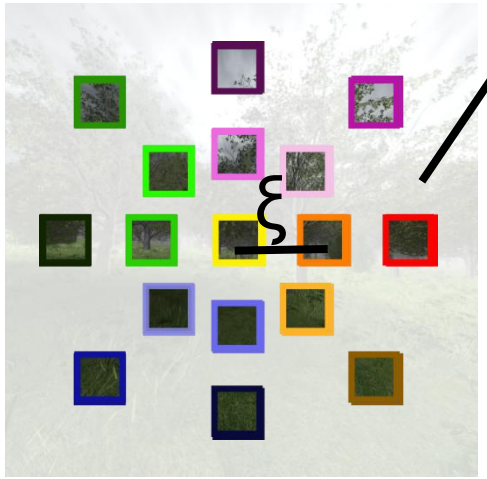


Tkacik,2011, Van Hateren, 1998

# Local Power Spectrum

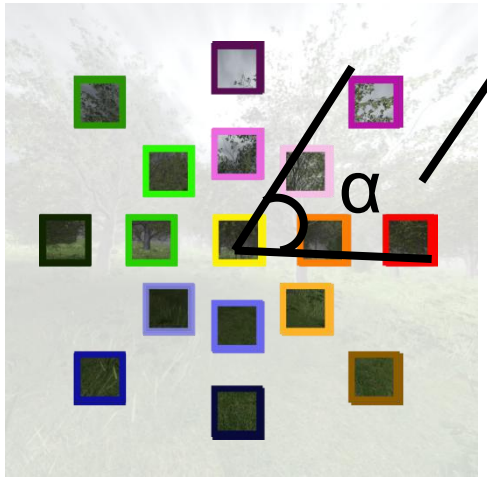


# Local Power Spectrum



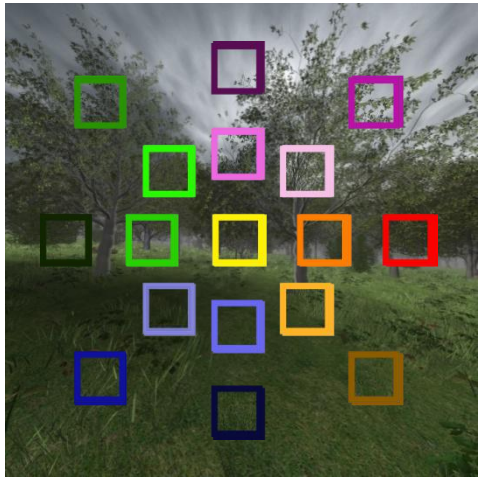
Eccentric angle

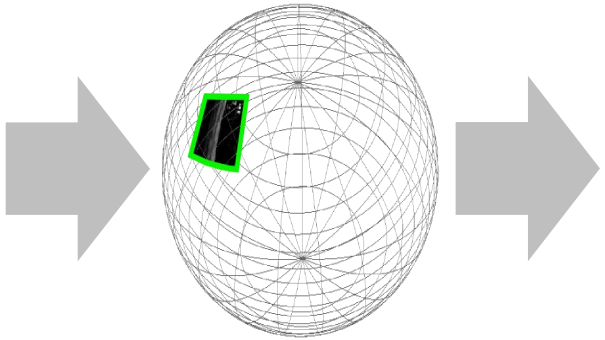
# Local Power Spectrum

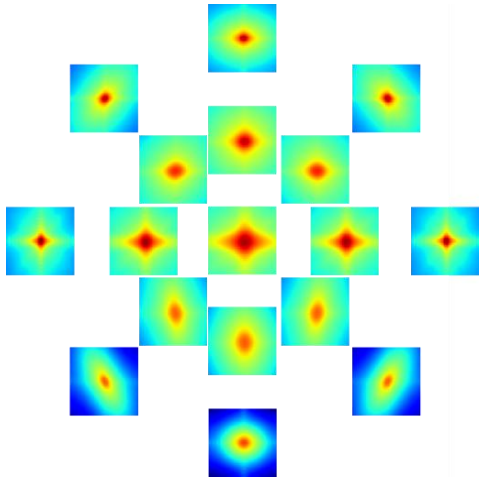



Polar angle

# Local Power Spectrum

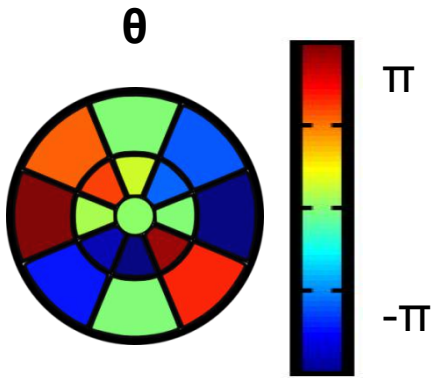




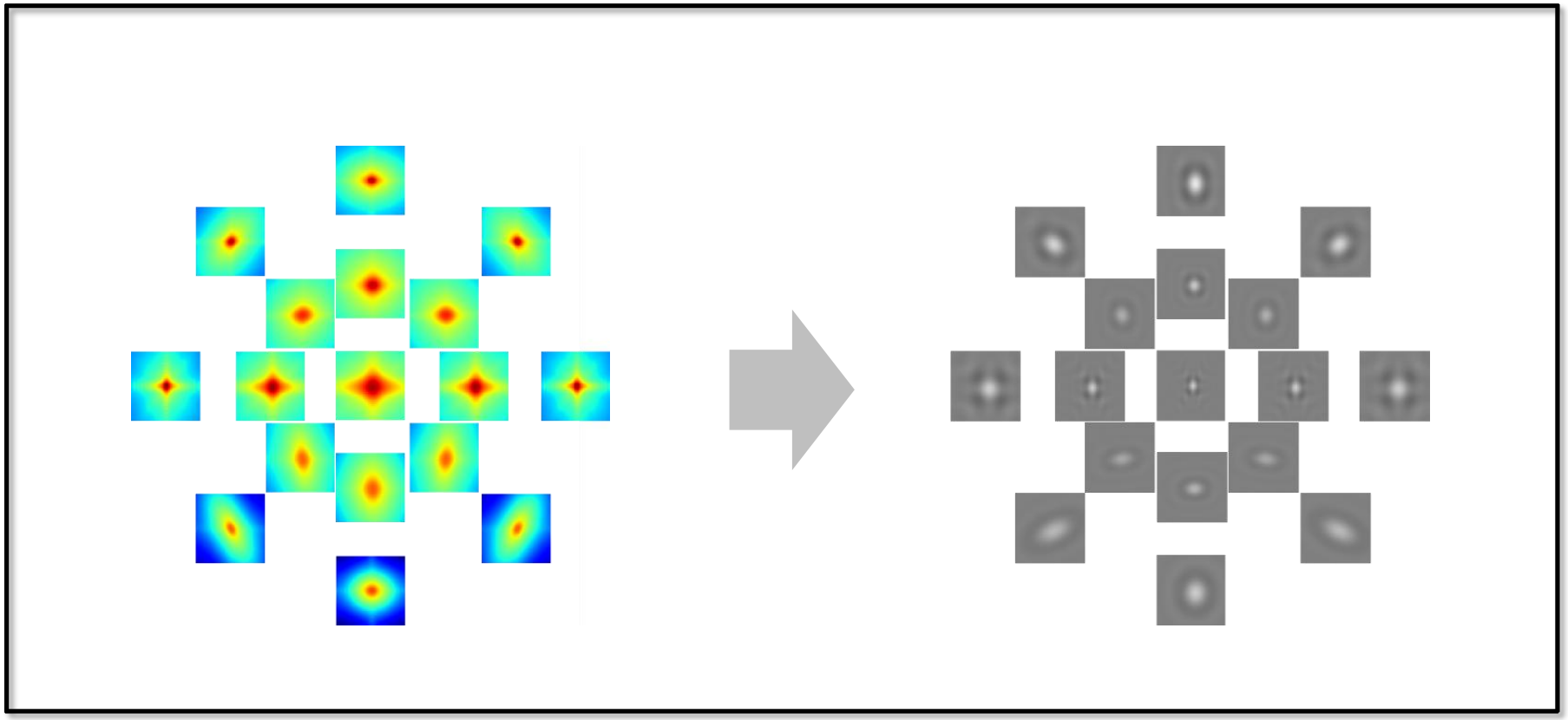


$$PS(f_x, f_y) = A\left((1-B)\frac{1}{(f_{xr}^2 + \frac{f_{yr}}{a}^2)^{\alpha}} + B\frac{1}{(f_x f_y)^{\beta}}\right)$$

$$(f_{xr}, f_{yr}) = (f_x\cos(\theta) + f_y\sin(\theta), -f_x\sin(\theta) + f_y\cos(\theta))$$

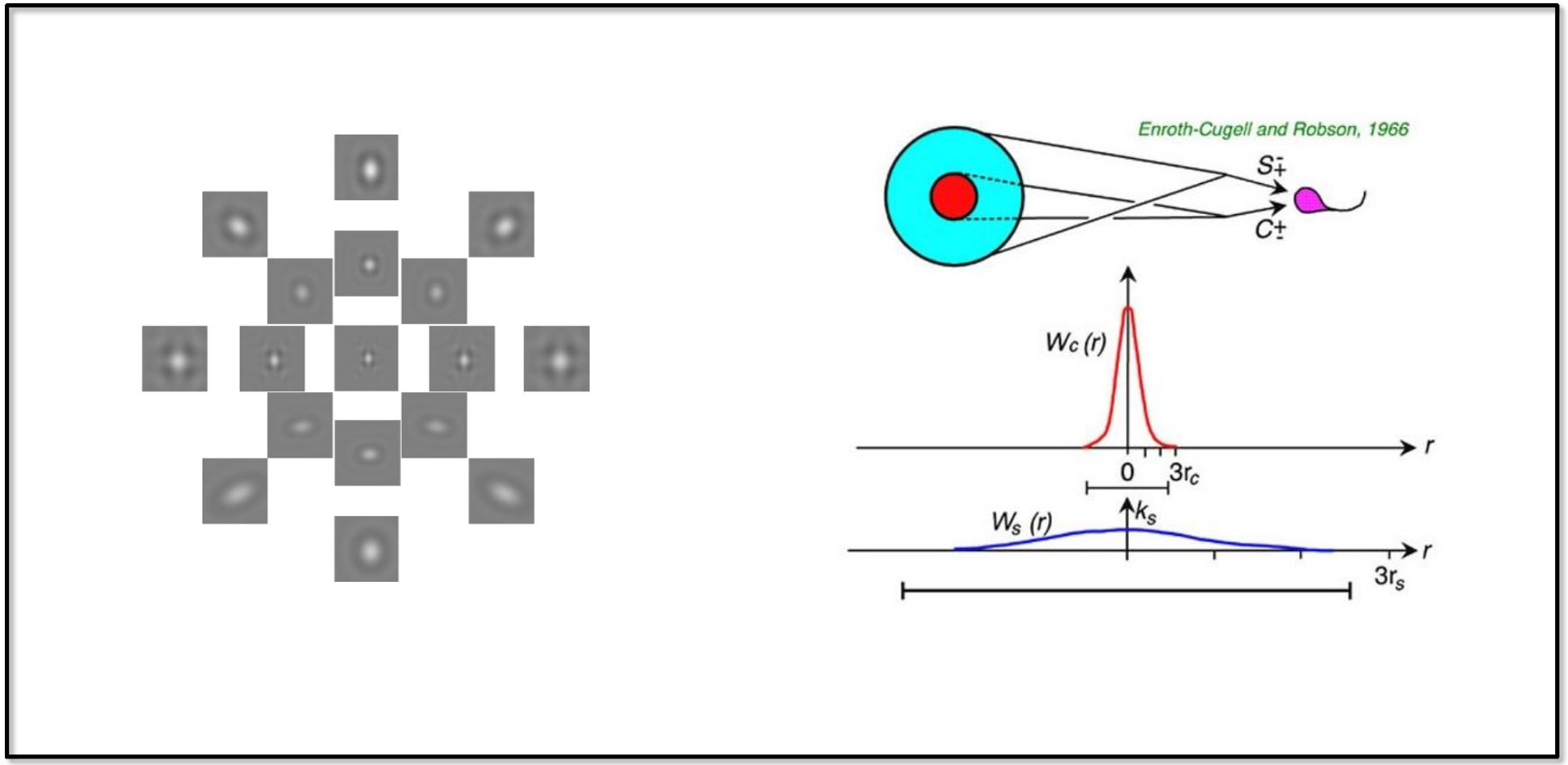


# Optimal Whitening Filters

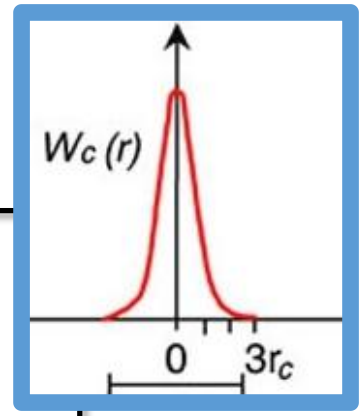


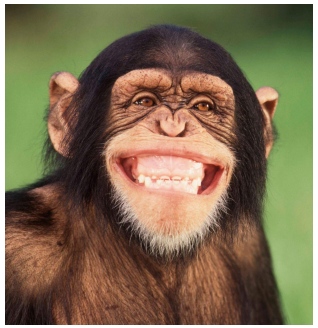
Dong and Attick, 1995

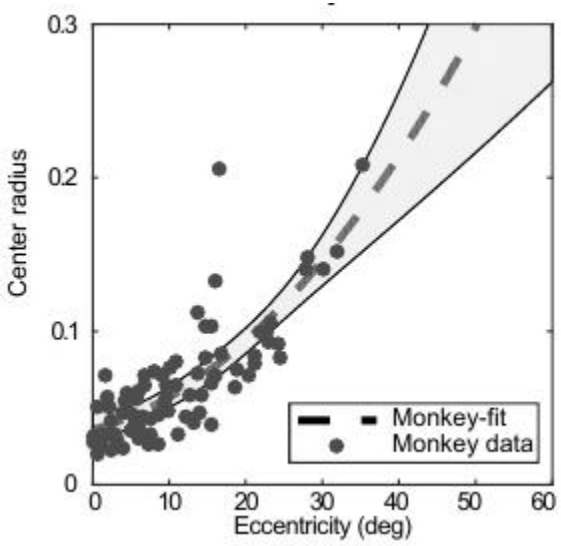
# Fitting and comparing with biology

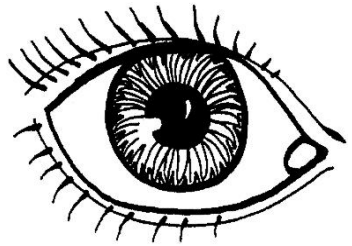


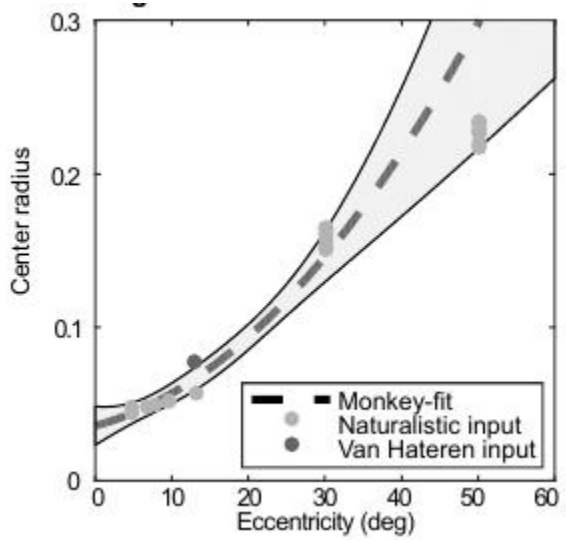
# Comparison with biology: RFs size



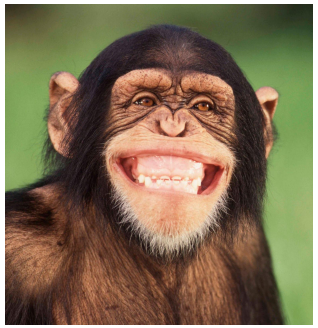



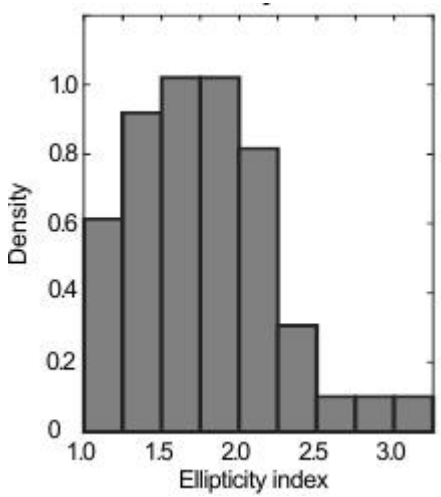


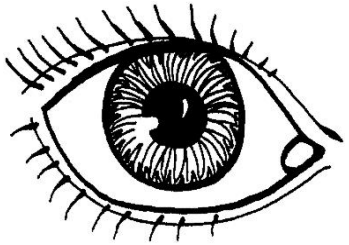



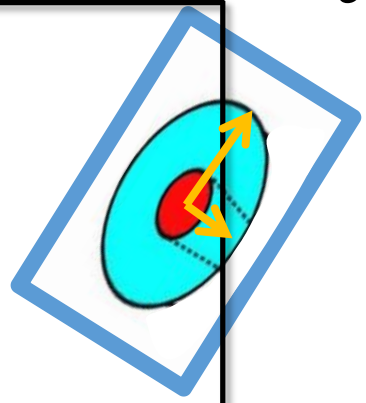


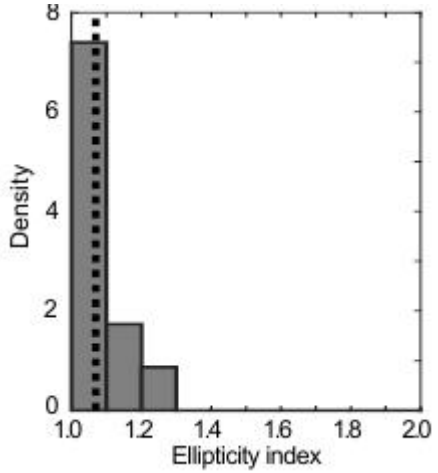
# Comparison with biology: RFs ellipticity



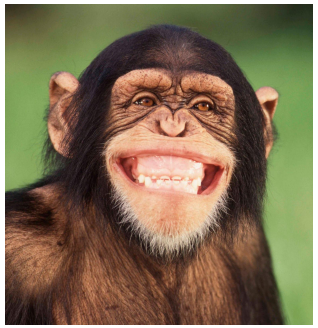


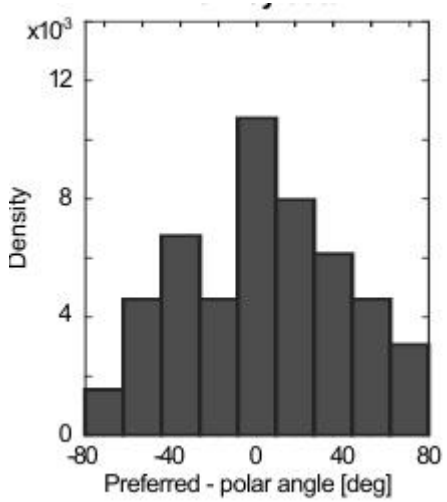



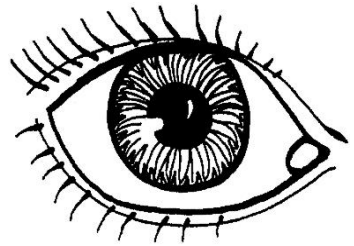


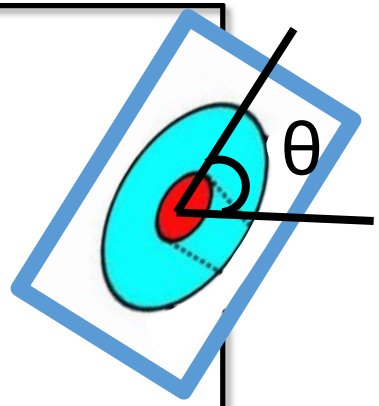


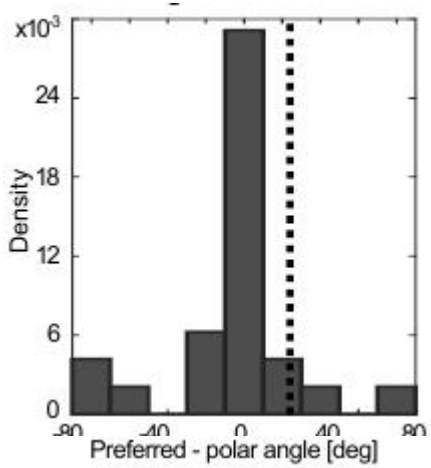
# Comparison with biology: RFs Orientation







# Summary