

Papers on methods for analysing colour in nature

The list is intended to be inclusive in that it'll contain reviews, and empirical papers that offer extensions, novel applications, or tests of assumptions. It may be missing a chunk of human-focused (CIE) work, because that literature is vast. Suggestions welcome via twitter ([@tomedwhite](http://www.twitter.com/tomedwhite)), #colsci), email, pull request, etc. If you can't get hold of something, I can probably pass it along.

Akkaynak 2014, [Use of spectroscopy for assessment of color discrimination in animal vision](#)

Akkaynak et al. 2014, [Use of commercial off-the-shelf digital cameras for scientific data acquisition and scene-specific color calibration](#)

Allen & Higham 2013, [Analysing visual signals as visual scenes](#)

Allen & Higham 2015, [Assessing the potential information content of multicomponent visual signals: a machine learning approach](#)

Armenta et al. 2008, [Quantifying avian sexual dichromatism: a comparison of methods](#)

Backhaus 1991, [Color opponent coding in the visual system of the honeybee](#)

Backhaus & Menzel 1987, [Color distance derived from a receptor model of color vision in the honeybee](#)

Barnard & Funt 2002, [Camera characterization for color research](#)

Bennett et al. 1994, [Sexual selection and the mismeasure of color](#)

Burnham et al. 1957, [Prediction of color appearance with different adaptation illuminations](#)

Brandt & Vorobyev 1997, [Metric analysis of threshold spectral sensitivity in the honeybee](#)

Cassey et al. 2012, [Sources of variation in reflectance spectrophotometric data: a quantitative analysis using avian eggshell colours](#)

Chittka 1992, [The colour hexagon: a chromaticity diagram based on photoreceptor excitations as a generalized representation of colour opponency](#)

Chittka et al. 1992, [Opponent color coding is a universal strategy to evaluate the photoreceptor inputs in Hymenoptera](#)

Chiao et al. 2009, [Visualization of the spatial and spectral signals of orb-weaving spiders, Nephila pilipes, through the eyes of a honeybee](#)

Cuthill et al. 1999, [Plumage reflectance and the objective assessment of avian sexual dichromatism](#)

Dalrymple et al. 2014, [Roses are red, violets are blue – so how much replication should you do? An assessment of variation in the colour of flowers and birds](#)

Dartnall 1953, [The interpretation of spectral sensitivity curves](#)

De Valois & De Valois 1993, [A multi-stage color model](#)

Delhey et al. 2014, [A practical framework to analyze variation in animal colors using visual models](#)

Dyer 2012, [The mysterious cognitive abilities of bees: why models of visual processing need to consider experience and individual differences in animal performance](#)

Endler 1989, [On the measurement and classification of colour in studies of animal colour patterns](#)

Endler 2012, [A framework for analysing colour pattern geometry: adjacent colours](#)

Endler & Mielke 2005, [Comparing entire colour patterns as birds see them](#)

Evans et al. 2010, [Age, sex and beauty: methodological dependence of age- and sex-dichromatism in the great tit *Parus major*](#)

Evans & Sheldon 2015, [A spectral perspective on the quantitative genetics of carotenoid colouration](#)

Garcia et al. 2014, [Flower colours through the lens: quantitative measurement with visible and ultraviolet digital photography](#)

Gerald et al. 2001, [Formal method for objective assessment of primate color](#)

Grill & Rush 2000, [Analysing spectral data: comparison and application of two techniques](#)

Goldsmith 1990, [Optimization, constraint, and history in the evolution of eyes](#)

Govardovskii et al. 2000, [In search of the visual pigment template](#)

Hart & Vorobyev 2005, [Modelling oil droplet absorption spectra and spectral sensitivities of bird cone photoreceptors](#)

Hastad & Odeen 2008, [Different ranking of avian colors predicted by modeling of retinal function in humans and birds](#)

Higham et al 2010, [Color signal information content and the eye of the beholder: a case study in the rhesus macaque](#)

Hurvich & Jameson 1955, [Some quantitative aspects of an opponent-colors theory. II. Brightness, saturation, and hue in normal and dichromatic vision](#)

Hurvich & Jameson 1956, [Some quantitative aspects of an opponent-colors theory. IV. A psychological color specification system](#)

Jameson & Hurvich 1955, [Some quantitative aspects of an opponent-colors theory. I. Chromatic responses and spectral saturation](#)

Jameson & Hurvich 1956, [Some quantitative aspects of an opponent-colors theory. III. Changes in brightness, saturation, and hue with chromatic adaptation](#)

Jameson & Hurvich 1964, [Theory of brightness and color contrast in human vision](#)

Kelber 1999, [Ovipositing butterflies use a red receptor to see green](#)

Kelber 2001, [Receptor based models for spontaneous colour choices in flies and butterflies](#)

Kelber et al. 2003, [Animal colour vision: behavioural tests and physiological concepts](#)

Kelber & Osorio 2009, [From spectral information to animal colour vision: experiments and concepts](#)

Kemp et al. 2008, [Ornamental evolution in Trinidadian guppies \(*Poecilia reticulata*\): insights from sensory processing-based analyses of entire colour patterns](#)

Lamb 1995, [Photoreceptor spectral sensitivities: Common shape in the long-wavelength region](#)

Lehnert et al. 2011, [A new method for quantifying color of insects](#)

Lind & Kelber 2009, [Avian colour vision: effects of variation in receptor sensitivity and noise data on model predictions as compared to behavioural results](#)

Luo et al. 2001, [The development of the CIE 2000 colour-difference formula](#)

Maia et al. 2012, [pavo: an R package for the analysis, visualization and organization of spectral data](#)

Maloney & Wandell 1986, [Color constancy: a method for recovering surface spectral reflectance](#)

Meadows et al. 2011, [Quantifying iridescent coloration in animals: a method for improving repeatability](#)

Medina et al. 2015, [Classification of peacock feather reflectance using principal component analysis similarity factors from multispectral imaging data](#)

McLaren 2008, [The development of the CIE 1976 \(\$L^*\$ \$a^*\$ \$b^*\$ \) uniform colour space and colour-difference formula](#)

Osorio et al. 2004, [Detection of fruit and the selection of primate visual pigments for color vision](#)

Parkkinen et al. 1988, [Spectral representation of color images](#)

Perex-Rodriguez et al. 2013, [Fractal geometry of a complex plumage trait reveals bird's quality](#)

Pike 2011, [Using digital cameras to investigate animal colouration: estimating sensor sensitivity functions](#)

Pike 2012, [Preserving perceptual distances in chromaticity diagrams](#)

Pike 2012, [Generalised chromaticity diagrams for animals with n-chromatic colour vision](#)

Renoult et al. 2009, [When assumptions on visual system evolution matter: nestling colouration and parental visual performance in birds](#)

Renoult et al. 2013, [A novel framework to study colour signalling to multiple species](#)

Santos et al. 2007, [Strong effects of various incidence and observation angles on spectrometric assessment of plumage colouration in birds](#)

Smith 2014, [Quantifying color variation: improved formulas for calculating hue with segment classification](#)

Stevens 2011, [Avian vision and egg colouration: concepts and measurements](#)

Stevens et al. 2007, [Using digital photography to study animal coloration](#)

Stevens et al. 2009, [Studying primate color: towards visual system-dependent methods](#)

Stoddard & Prum 2008, [Evolution of avian plumage color in a tetrahedral color space: a phylogenetic analysis of new world buntings](#)

Stoddard & Stevens 2010, [Avian vision and the evolution of egg color mimicry in the common cuckoo](#)

Stoddard et al. 2014, [Pattern recognition algorithm reveals how birds evolve individual egg pattern signatures](#)

Stokman et al. 2000, [Color measurement by imaging spectrometry](#)

Strachan et al. 1990, [Calibration of a video camera digitising system in the CIE \(\$Luv\$ \) colour space](#)

Taylor et al. 2013, [Distance transform: a tool for the study of animal colour patterns](#)

Tkalcic et al. 2003, [Colour spaces: perceptual, historical and applicational background](#)

Troje 1993, [Spectral categories in the learning behaviour of Blowflies](#)

van Hateren 1993, [Spatial, temporal and spectral pre-processing for colour vision](#)

Villafuerte & Negro 2002, [Digital imaging for colour measurement in ecological research](#)

Vinther 2015, [A guide to the field of palaeo colour](#)

Vorobyev 2003, [Coloured oil droplets enhance colour discrimination](#)

- Vorobyev & Osorio 1998, [Receptor noise as a determinant of colour thresholds](#)
- Vorobyev et al. 1998, [Tetrachromacy, oil droplets and bird plumage colours](#)
- Vorobyev et al. 2001, [Colour thresholds and receptor noise: behaviour and physiology compared](#)
- Vukusic & Stavenga 2009, [Physical methods for investigating structural colours in biological systems](#)
- Wachtler et al. 2004, [Modeling color percepts of dichromats](#)
- Zuk & Decruyenaere 2008, [Measuring individual variation in colour: a comparison of two techniques](#)