

Modvis: 2015-2019

Methods

[The psychophysics of metacognition and meta d'.](#)

Klein, S. 2015.

[A conceptual framework of computations in mid-level vision.](#)

Kubilius, J., Wagemans, J. & de Beeck, H. P. O. 2015.

[Testing the Bayesian confidence hypothesis.](#)

Ma, W.J. & van den Berg, R. 2015.

[Towards a unified computational model of contextual interactions across visual modalities.](#)

Mély, D.A. & Serre, T. 2015.

[A signal detection experiment with limited number of trials.](#)

Sawada, T. 2015.

[The bounded log-odds model of frequency and probability distortion.](#)

Zhang, H. & Maloney, L.T. 2015.

[Video event understanding with pattern theory.](#)

Souza, F., Sarkar, S., Srivastava, A. & Su, J. 2015.

[Choice-dependent perceptual biases.](#)

Luu, L. & Stocker, A.A. 2016.

[Derivatives and inverse of a linear-nonlinear multi-layer spatial vision model.](#)

Galan, B., Martinez-Garcia, M., Cyriac, P., Batard, T., Bertalmio, M. & Malo, J. 2016.

[Texture modeling using convolutional neural networks.](#)

Gatys, L.A., Ecker, A.S. & Bethge, M. 2016.

[Virtual VIsion: a collaborative coding project.](#)

Olman, C. 2016.

[Role of the cost of plasticity in determining the features of fast vision in humans.](#)

Del Viva, M.M., Budinich, R., Palmieri, L., Georgiev, V.S. & Punzi, G. 2017.

[Positive or correlated channels in parallel race systems: help or hurt?](#)

Townsend, J.J., Zhang, R., Liu, Y. & Wenger, M.J. 2017.

[Analyzing thresholds and efficiency with hierarchical Bayesian logistic regression.](#)

Houpt, J.W., & Bittner, J.L. 2017.

[Elucidating and testing hierarchical visual models using model-optimized synthetic stimuli.](#)

Simoncelli, E. 2018.

[Appropriate kernels for divisive normalization explained by Wilson-Cowan equations.](#)

Malo, J. & Bertalmio, M. 2018.

[Tutorial on a theory-driven methodology for identification of vital properties of elementary cognitive processes: systems factorial technology.](#)

Townsend, J., Liu, Y. & Jefferson, B. 2018.

[The channel capacity of visual awareness.](#)

Lappin, J. 2018.

[Texture statistics are sufficient for ensemble perception.](#)

Cain, S. & Cain, M. 2018.

['Preferred' stimulus of a whole model visual system.](#)

Penacchio, O. & Harris, J. 2018.

[An observer model version of general recognition theory.](#)

Soto, F. 2019.

[Quantified measurement of the tilt effect in a family of Café Wall illusions.](#)

Nematzadeh, N. & Powers, D.M. 2019.

[Modeling visual enumeration using cumulative link regression.](#)

Cate, A.D. 2019.

[Virtual eye: a spatial-temporal bottom-up eye sensitivity model.](#)

Goodall, T. 2019.

[Differentiating changes in population encoding models with psychophysics and neuroimaging.](#)

Hays, J. & Soto, F. 2019.

[Modeling human perception of high gloss materials using neural networks.](#)

Prokott, K.E., Tamura, H. & Fleming, R.W. 2019.

[Towards human retinal cones spatial distribution modeling.](#)

Lanaro, M.P., Perrier, H., Coeurjolly, D., Ostromoukhov, V. & Rizzi, A. 2019.

Neuroscience

[Characterizing receptive field selectivity in area V2.](#)

Ziamba, C.M., Goris, R.L.T., Movshon, J.A. & Simoncelli, E.P. 2015.

[Parametrically constrained lightness model incorporating edge classification and increment-decrement neural response asymmetries.](#)

Michael E. Rudd. 2016.

[A geometric approach to sparse coding yields insight into nonlinear responses.](#)

Vilankar, K., Golden, J. & Field, D. 2016.

Spatial synaptic growth and removal for learning individual receptive field structures.

Teichmann, M. & Hamker, F.H. 2016.

Towards a unified model of classical and extra-classical receptive fields.

Mély, D.A. & Serre, T. 2016.

Towards a functional explanation of the connectivity LGN - V1.

Martinez-Garcia, M., Galan, B., Martinez, L.M. & Malo, J. 2016.

Modeling response properties across the orientation map in visual cortex.

Koch, E.M., Jin, J., Alonso, J.-M. & Zaidi, Q. 2016.

Identifying falsifiable predictions of the divisive normalization model of V1 neurons.

Sawada, T. & Petrov, A.A. 2016.

A neural circuit for visual information spreading.

Francis, G. 2016.

Mapping the spatio-temporal dynamics of vision in the human brain.

Oliva, O. 2017.

Gabor limits and hyper-selectivity in the tuning of V1 neurons.

Field, D.J., & Vilankar, K.P. 2017.

Evaluating and interpreting a convolutional neural net as a model of V4.

Pospisil, D.A., Pasupathy, A. & Bair, W. 2017.

Unifying binocular, spatial, and spatio-temporal frequency integration in models of MT neurons.

Baker, P.M. & Bair, W. 2017.

Modeling the neural circuitry underlying the behavioral and EEG correlates of attentional capture.

Callahan-Flintoft, C. & Wyble, B. 2017.

Comparing diverse V1 models on the same platform: Virtual V1sion.

Olman, C. 2017.

Similarity-based fusion of MEG and fMRI discerns early feedforward and feedback processing in the ventral stream.

Mohsenzadeh, Y., Cichy, R.M., Oliva, A. & Pantazis, D. 2017.

Modeling neural computations in LGN and visual cortex that underlie contextual modulation of lightness and darkness magnitudes in simple and complex images.

Rudd, M. 2018.

Visual category learning by means of Basal Ganglia.

Hamker, F., Villagrasa, F., Baladron, J., Schroll, H. & Vitay, J. 2018.

Effect of noise on mutually inhibiting pyramidal cells in visual cortex: foundation of stochasticity in bi-stable perception.

Kogo, N., Kern, F., Nowotny, T., van Ee, R., van Wezel, R. & Aihara, T. 2018.

[*Inferring the neural representation of faces from adaptation aftereffects.*](#)

Emery, K. & Webster, M. 2018.

[*Linking signal detection theory and encoding models to reveal independent neural representations from neuroimaging data.*](#)

Soto, F. 2018.

[*Variance partitioning reveals consistent representation of object boundary contours in LO across different datasets.*](#)

Lescroart, M.D. & Singhal, U. 2019.

[*Functional organization of cortical maps for ocular dominance and light-dark polarity in primary visual cortex.*](#)

Najafian, S., Jin, J.Z. & Alonso, J-M. 2019.

Early vision

[*A linearized model for flicker and contrast thresholds at various retinal illuminances.*](#)

Ahumada, A.J. & Watson, A.B. 2015.

[*Time-lapse statistics of cone signals from natural scenes.*](#)

Foster, D.H., Amano, K. & Nascimento, S.M.C. 2015.

[*A learning model for L/M specificity in ganglion cells.*](#)

Ahumada, A. 2016.

[*An image-based model for early visual processing.*](#)

Schütt, H.H. & Wichmann, F.A. 2016.

[*A computational account of a class of orientation illusions.*](#)

Todorovic, D.M. 2017.

[*Computational modeling of contrast sensitivity and orientation tuning in schizophrenia.*](#)

Silverstein, S.M., Demmin, D.L. & Bednar, J.A. 2017.

[*Spatial-temporal visible contrast energy predictions of detection thresholds.*](#)

Ahumada, A., Watson, A.B. & Yeonan-Kim, J. 2017.

[*Neural computation of statistical image properties in peripheral vision.*](#)

Zetsche, C., Rosenholtz, R., Cheema, N., Gadzicki, K. & Fridman, L. 2017.

[*An active efficient coding model of the development of amblyopia.*](#)

Eckmann, S., Klimmasch, L., Shi, B. & Triesch, J. 2018.

Color, lightness, transparency

[*'Edge' integration explains contrast and assimilation in a gradient lightness illusion.*](#)

Rudd, M.E. 2015.

[Failure of surface color cues under natural changes in lighting.](#)

Foster, D.H. & Marín-Franch, I. 2016.

[Can cone signals in the wild be predicted from the past?](#)

Foster, D.H. & Marín-Franch, I. 2017.

[Color algebras.](#)

Mulligan, J.B. 2017.

[Modeling accommodation control of the human eye: chromatic aberration and color opponency.](#)

Gibaldi, A., Cholewiak, S.A. & Banks, M.S. 2017.

[Edge integration and image segmentation in lightness and color: computational and neural theory.](#)

Rudd, M.E. 2017.

[Using classification images to understand models of lightness perception.](#)

Kim, M., Gold, J.M. & Murray, R.F. 2017.

[Brightness perception involves local adaptation opposed by lateral interaction.](#)

Zaidi, Q., Bachy, R. & Alonso, J-M. 2018.

[Michelson contrast for transparency perception in scenes with multiple luminances.](#)

Kim, M., Aguilar, G. & Maertens, M. 2018.

[A contrast-based model of achromatic transparency.](#)

Maertens, M., Kim, M. & Aguilar, G. 2018.

[The challenge for vision of fluctuating real-world illumination.](#)

Foster, D.H. 2019.

[Explaining the lightness of real illuminated surfaces viewed under Gelb illumination with a neurocomputational model.](#)

Rudd, M.E. 2019.

[Color transparency from motions of backgrounds and overlays.](#)

Huang, Z. & Zaidi, Q. 2019.

Binocular vision

[A critical evaluation of computational mechanisms of binocular disparity processing.](#)

Kim, J., Mély, D.A. & Serre, T. 2015.

[The role of contrast sensitivity in the development of binocular vision: a computational study.](#)

Priamikov, A., Narayan, V., Shi, B.E. & Triesch, J. 2015.

[A Binocular Model for Motion Integration in MT Neurons.](#)

Baker, P.M. & Bair, W. 2015.

[Binocular 3D motion perception as Bayesian inference.](#)

Lages, M. & Heron, S. 2015.

[Can neuromorphic computer vision inform vision science? Disparity estimation as a case study.](#)

Maiello, G., Chessa, M., Bex, P.J. & Solari, F. 2016.

[Central and peripheral difference in perceptual bias in ambiguous perception using dichoptic stimuli --- implications for the analysis-by-synthesis process in visual recognition.](#)

Zhaoping, Li. 2017.

[Recovering depth from stereo without using any oculomotor information.](#)

Sawada, T. 2019.

Motion

[A space-variant model for motion interpretation across the visual field.](#)

Maiello, G., Chessa, M., Bex, P.J. & Solari, F. 2015.

[Adaptive motion pooling and diffusion for optical flow.](#)

Medathati, N.V.K., Kornprobst, P., Masson, G., Chessa, M. & Solari, F. 2015.

[Modeling visual features to recognize biological motion: a developmental approach.](#)

Sandini, G., Noceti, N., Sciutti, A., Rea, F., Verri, A. & Odone, F. 2015.

[A mixture model demonstrates use of distinct strategies in a global motion direction task.](#)

Cai, L.T. & Backus, B.T. 2016.

[A model of 1D and 2D motion processing in the primate brain.](#)

Johnston, J. 2018.

[Model investigation on contribution of feedback in distortion induced motion adaptation.](#)

Wahl, S., Habtegiorgis, S., Jarvers, C., Rifai, K. & Neumann, H. 2018.

[A theory to explain the perceived motion direction of equal-spatial-frequency plaid stimuli.](#)

Sperling, S., Sun, P., Liu, D. & Lin, L. 2019.

Figure-ground organization

[Perceptual grouping using superpixels.](#)

Dickinson, S. 2015.

[Spatially-global integration of closed contours by means of shortest-path in a log-polar representation.](#)

Kwon, T., Agrawal, K., Li, Y. & Pizlo, Z. 2015.

[Computational modeling of depth-ordering in occlusion through accretion or deletion of texture.](#)

Ruda, H., Livitz, G., Riesen, G. & Mingolla, E. 2015.

[Figure-ground organization emerges in a deep net with a feedback loop.](#)

Zipser, K., Yu, S.X. & Olshausen, B.A. 2015.

[Image segmentation using fuzzy-spatial taxon cut.](#)

Barghout, L. 2015.

[Modeling the joint distribution of scene events at an edge.](#)

Elder, J. & Li, Y. 2016.

[Disentangling the roles of junctions and spatial relations between contours for scene categorization.](#)

Wilder, J., Walther, D., Jepson, A. & Dickinson, S. 2016.

[Learning to identify depth edges in real-world images with 3D ground truth.](#)

Ehringer, K.A., Joseph, K.T., Adams, W.J., Graf, E.W. & Elder, J.H. 2017.

[Divisive inhibition as a solution to the correspondence problem in perceptual grouping.](#)

Chen, C-C., Lin, Y-S. & Lin, L. 2018.

[Use of local image information in depth edge classification by humans and neural networks.](#)

Ehringer, K., Adams, W., Graf, E. & Elder, J. 2018.

[Contour integration in real images.](#)

Sun, P., Duan, R., Hii, D. & Pizlo, Z. 2019.

Shapes and objects

[Can computational models of shape explain object perception?](#)

Arun, S.P. & Pramod, R.T. 2015.

[Appearance controls interpretation of orientation flows for 3D shape estimation.](#)

Cholewiak, S.A., Vergne, R., Kunsberg, B., Zucker, S.W. & Fleming, R.W. 2015.

[Formal aspects of non-rigid-shape-from-motion perception.](#)

Froyen, V. & Zaidi, Q. 2015.

[Bayesian modeling of 3D shape inference from line drawings.](#)

Kim, S., Feldman, J. & Singh, M. 2015.

[A recurrent multilayer model with Hebbian learning and intrinsic plasticity leads to invariant object recognition and biologically plausible receptive fields.](#)

Teichmann, M. & Hamker, F.H. 2015.

[Modeling shape representation in area V4.](#)

Bair, W., Popovkina, D., De, A. & Pasupathy, A. 2015.

[How is it possible that we infer shape from image information?](#)

Zucker, S. 2016.

[How deep is the feature analysis underlying rapid visual categorization?](#)

Eberhardt, S., Cader, J. & Serre, T. 2016.

[Modeling grip point selection in human precision grip.](#)

Maiello, G., Klein, L., Paulun, V.C. & Fleming, R.W. 2017.

Heuristics from statistics—modeling the behavior and perception of non-rigid materials.

Paulun, V.C. & Fleming, R.W. 2017.

Large-scale discovery of visual features for object recognition.

Linsley, D., Eberhardt, S., Shiebler, D. & Serre, T. 2017.

Shape features underlying the perception of liquids.

van Assen, J.J.R., Barla, P. & Fleming, R.W. 2017.

Determining visual shape features for novel object classes.

Morgenstern, Y., Schmidt, F. & Fleming, R.W. 2017.

A single shape from multiple cues: how local and global information organizes shape inference.

Kunsberg, B. & Zucker, S.W. 2017.

Why latent representations in convolutional neural networks fall outside visual space.

Malakhova, K. 2018.

Perspective geometry explains perceived 3D object poses in real scenes and pictures.

Koch, E., Baig, F. & Zaidi, Q. 2018.

Global estimation of signed 3D surface tilt from natural images.

Kim, S. & Burge, J. 2018.

A feature-based model of visually perceiving deformable objects.

Paulun, V., Schmidt, F. & Fleming, R. 2018.

The road towards image-computable models of human visual grasp planning.

Maiello, G., Klein, L., Paulun, V., Storrs, K. & Fleming, R. 2018.

Understanding qualitative 3D shape from texture and shading.

Kunsberg, B. & Zucker, S. 2018.

Mental geometry for estimating relative 3D size.

Maruya, A. & Zaidi, Q. 2019.

The fluid representations of networks estimating liquid viscosity.

van Assen, J.J.R., Nishida, S. & Fleming, R.W. 2019.

Eye movements

A computational model to account for dynamics of spatial updating of remembered visual targets across slow and rapid eye movements.

Mohsenzadeh, Y. & Crawford, J.D. 2015.

Focusing on selection for fixation.

Tsotsos, J.K., Wloka, C. & Kotseruba, Y. 2016.

Modelling short-latency disparity-vergence eye movements under dichoptic unbalanced stimulation.

Gibaldi, A., Maiello, G., Bex, P.J. & Sabatini, S.P. 2016.

Using deep features to predict where people look.

Kümmerer, M. & Bethge, M. 2016.

Real time learning level assessment using eye-tracking.

Parikh, S.S. & Kalva, H. 2017.

Predicting fixations from deep and low-level features.

Kuemmerer, M., Wallis, T.S.A., Gatys, L.A. & Bethge, M. 2017.

Discovery of activities via statistical clustering of fixation patterns.

Mulligan, J. 2018.

Predicting the fixation density over time.

Schütt, H., Rothkegel, L., Trukenbrod, H., Engbert, R. & Wichmann, F. 2018.

Modeling emmetropization in an incessantly moving eye.

Rucci, M. & Victor, J. 2018.

Selecting maximally-predictive deep features to explain what drives fixations in free-viewing.

Kümmerer, M., Wallis, T.S.A. & Bethge, M. 2019.

Attention

Object recognition and visual search with a physiologically grounded model of visual attention.

Beuth, F. & Hamker, F.H. 2015.

Putting saliency in its place.

Tsotsos, J.K. 2015.

A model of repetitive microsaccades, coupled with pre- microsaccadic changes in vision, is sufficient to account for both attentional capture and inhibition of return in Posner cueing.

Hafed, Z.M. & Tian, X. 2015.

Measuring and modeling shared visual attention.

Mulligan, J.B. & Gontar, P. 2016

Precise measurements of perceptual attention filters for features.

Sun, P., Chubb, C., Wright, C.E., Drew, S. & Sperling, G. 2016.

Learning object Representations for modeling attention in real world scenes.

Schwarz, A., Beuth, F. & Hamker, F.H. 2016.

Modeling the mechanisms of reward learning that bias visual attention.

Hays, J. & Soto, F. 2017.

Modeling distribution learning in visual search.

Chetverikov, A. 2017.

Consistent saliency benchmarking: how one model can win on all metrics.

Kümmerer, M., Wallis, T. & Bethge, M. 2018.

Finding any Waldo: zero-shot invariant and efficient visual search.

Kreiman, G. & Zhang, M. 2018.

Computations of top-down attention by modulating V1 dynamics.

Berga, D. & Otazu, X. 2019.

Is the selective tuning model of visual attention still relevant?

Tsotsos, J.K. 2019.

SMILER: consistent and usable saliency model implementations.

Kunic, T., Wloka, C. & Tsotsos, J.K. 2019.

Symmetry

Two correspondence problems easier than one.

Michaux, A. & Pizlo, Z. 2015.

Figure-ground organization using 3D symmetry.

Michaux, M., Jayadevan, V., Delp, E. & Pizlo, Z. 2016.

3-D shape recovery from a single camera image.

Jayadevan, V., Michaux, A., Delp, E. & Pizlo, Z. 2016.

Scoring scene symmetry.

Rezanejad, M., Wilder, J.D., Dickinson, S., Jepson, A., Walther, D.B. & Siddiqi, K. 2017.

The role of symmetry in scene categorization by human observers.

Wilder, J.D., Rezanejad, M., Dickinson, S., Jepson, A., Siddiqi, K. & Walther, D.B. 2017.

Perception of 3D symmetrical and near-symmetrical shapes.

Jayadevan, V., Michaux, A., Delp, E. & Pizlo, Z. 2017.

Measuring symmetry in real-world scenes using derivatives of the medial axis radius function.

Rezanejad, M., Wilder, J., Siddiqi, K., Dickinson, S., Jepson, A. & Walther, D. 2018.

The role of symmetry in computational models of 3D vision.

Pizlo, Z. 2018.

Human versus machine perception of patterns or a visual Turing test: “are you a human or a robot?”

Liu, Y. 2019.