Curriculum Vitae

Wilson S. Geisler

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Address: Center for Perceptual Systems
108 East Dean Keeton
The University of Texas at Austin
1 University Station A8000
Austin, TX 78712-7789

Telephone: 512-471-5380/512-471-7356(FAX)

E-mail: w.geisler@utexas.edu **Web**: http://www.utexas.edu/cola/centers/cps/

Education:

B.A. Psychology, Stanford University, 1971
Ph.D. Psychology, Indiana University, 1975 (Supervisors: S.L. Guth and R.M. Shiffrin)
Dissertation: *Visual Adaptation and Inhibition*

Research and Professional Experience:

1971 - 1975	Trainee in Mathematical Psychology, Indiana University
1975 - 1981	Assistant Professor of Psychology, University of Texas
1981 - 1987	Associate Professor of Psychology, University of Texas
1987 - present	Professor of Psychology, The University of Texas
1991 - present	Professor, Biomedical Engineering Program, University of Texas
1994 - 2001	Director, Center for Vision and Image Sciences, University of Texas
1994 - present	Professor, Institute for Neuroscience, University of Texas
2001 - present	Director, Center for Perceptual Systems, University of Texas
2001 - present	David Wechsler Regents Chair in Psychology

Honors:

Fellow of the Optical Society of America (1992)
Research Excellence Award from the University of Texas (1997)
David Wechsler Regents Chair in Psychology (2001)
Elected to the Academy of Medicine, Engineering and Science of Texas (2008)
Elected to the National Academy of Sciences (2008)
Silver Fellow of the Association for Research in Vision and Ophthalmology (2011)
Fellow of the Society of Experimental Psychologists (2012)
Distinguished Alumni Award, Department of Psychological and Brain Sciences, Indiana University (2014)

Service:

National Institutes of Health, Member Visual Sciences B Study Section (1987-1991)
Optical Society of America, Vice-Chair and Chair of Vision Technical Committee (1990-1993)
Association for Research in Vision and Ophthalmology, Member and Chair of Program Committee, (1992-1995)
Optical Society of America, Program Committee (1993-1995)
Vision Research, Editorial Board (1993-2000)
Vision Research, Section Editor (1999-2000)
Annual Review of Psychology, Editorial Board (1999-2003)
Journal of Vision, Editorial Board (2000-present)
Journal of Optical Society of America, Guest Editor for special issue (2002-2003)
Vision Sciences Society, Board of Directors (2006-2009)
Vision Sciences Society, President-elect, President, Past-President (2007-2009)
Optical Society of America, Chair Tillyer Award Committee (2007)
Organized workshop at UT titled *Natural Environments, Tasks and Intelligence* (2008)
Visual Neuroscience, Guest Editor for special issue on *Natural Systems Analysis* (2008)
PNAS Action Editor (2008-present)
Organized workshop at UT titled *Natural Environments, Tasks and Intelligence* (2010)
Troland Award Committee (2010-2011)
PNAS Editorial Board (2011-2016)
National Institutes of Health, Member Review Committee for Intramural Program (2011)
Organized workshop at UT titled *Natural Environments, Tasks and Intelligence* (2012)
Gatsby Scientific Advisory Board, *University College London* (2014-2019)
Visual Sciences Society Nominating Committee (2014-2015)
Organized workshop at UT titled *Natural Environments, Tasks and Intelligence* (2014)
National Institutes of Health, Mechanisms of Sensory, Perceptual, and Cognition Processes Study Section (June 2015)
Organized workshop at UT titled *Natural Environments, Tasks and Intelligence* (2016)
NAS Standing Committee on *Reducing Counterfeiting Using the Behavioral Sciences* (2016-2018)
National Institutes of Health, Training Grant Study Section (November 2018)
Board on Behavioral, Cognitive and Sensory Sciences (BBCSS) at the National Academies of Sciences, Engineering, and Medicine (2019-2021)

Professional Affiliations:

American Association for the Advancement of Science
Association for Research in Vision and Ophthalmology
Optical Society of America
Vision Sciences Society
Society for Neuroscience
Society of Experimental Psychologists
Academy of Medicine, Engineering and Science of Texas
National Academy of Sciences

Grants:

Research initiation award from the University Research Institute at the University of Texas at Austin (PI) (Sept. 1975 - Sept. 1977).

NIH Grant (PI) "Adaptation in the human rod and cone systems" (Dec. 1978 - Dec. 1981).

NIH Grant (PI) "Mechanisms of Detection, Adaptation and Spatial Vision" (December 1981 - December 1985).

NIH Grant (PI) "Peripheral Mechanisms of Spatial Discrimination" (December 1985 - December 1989).

Project Quest Equipment Grant (PI) "A Biological and Computer Vision Instructional/Research Laboratory"(1987).

NIH Grant (PI) "Peripheral Mechanisms of Visual Discrimination" (December 1989 - December 1994).

State of Texas Advanced Research Program (lead PI with one co-PI) "Visual Pattern Analysis" (January 1992 - January 1994).

AFOSR University Research Initiative Grant (lead PI with 6 co-PIs) "Local Spatio-temporal Analysis in Vision Systems" (May 1, 1993 - May 31, 1997)

AFOSR STTR Phase I Grant (PI) with Owl Displays Inc., “Foveating Vision System to Reduce Transmission Bandwidth of Video Images from Remote Camera Systems” (September 30, 1994 - March 31, 1995).

NIH Grant (PI) “Peripheral Mechanisms of Visual Discrimination” (December 1994 - November 1998).

College of Liberal Arts Grant (PI) awarded to the Center for Vision and Image Sciences (1995).

AFOSR STTR Grant Phase II (PI) with Owl Displays Inc., “Foveating Vision System to Reduce Transmission Bandwidth of Video Images from Remote Camera Systems” (October, 1996 - October, 1998).

NIH Grant (PI) “Perceptual Organization of Two-Dimensional Images” (June 1997-May, 2001).

University of Texas ITAC teaching equipment grant (PI) (September 1998 – August, 1999).

NIH Grant (PI) “Mechanisms of Visual Performance” (December 1998 - November 2003).

NIH Grant (PI) “Perceptual Organization of Two-Dimensional Images” (June 2001-Nov., 2006).

NIH Grant (PI) “Mechanisms of Visual Performance” (December 2003 - November 2008).

NSF Grant (Alan Bovik PI) ITR: “Foundations of Visual Search” (December 2004 – November 2009).

NIH Grant (PI) “Perceptual Organization of Two-Dimensional Images” (June 2007 - May 2012).

NIH Grant (PI) “Mechanisms of Visual Performance” (December 2008 - November 2012).

NSF Large Collaborative Research Grant (Michael Lewicki PI) “3D Structure and Motion in Dynamic Scenes” (September 2011 – August 2015).

NIH Grant (Mary Hayhoe PI) “CPS Training Grant” (2012-2017)

NIH Grant (PI) “Perceptual Organization of Two-Dimensional Images” (5/1/2012 – 4/30/2016).

Fulbright Scholarship (Student: Filip Dechterenko) “Eye gaze training using the Ideal Bayesian Observer in subjects with artificial scotoma” (11/1/2015 – 5/1/2016).

NIH Grant (PI) “Visual Search and Detection in Natural Scenes” (9/1/2015-8/31/2019).

NIH Grant (Eyal Seidemann PI) “An optical-genetic toolbox for reading and writing neural population codes in functional maps” (9/1/2016 – 8/31/2019).

NIH Grant (PI) "Detection and Estimation of Local Image Properties in Natural Scenes” (12/1/2016 – 11/30/2020).

NIH Grant (Mary Hayhoe PI) “CPS Training Grant” (2017-2023).

Fulbright Fellowship (Carlos Dorronsoro) “Development of computational models to understand visual perception with multifocal corrections” (6/1/2017 – 9/30/2017).

eSight “Technology Validation Contract” (8/01/2018 – 8/01/2019).

Publications

Refereed Publications

1. Edgell, S. E., Geisler, W. S., and Zinnes, J. L. (1973) A note on a paper by Rumelhart and Greeno. *Journal of Mathematical Psychology* 10, 87-90.

2. Geisler, W. S. (1978) Effects of photopigment depletion on brightness and threshold. *Vision Research,* 18, 269-278.

3. Geisler, W. S. (1978) Adaptation, afterimages and cone saturation. *Vision Research,* 18, 279-289.

4. Geisler, W. S. (1979) Evidence for the equivalent-background hypothesis in cones. *Vision Research*, 19, 799-805.

5. Geisler, W. S. (1979) Initial-image and afterimage discrimination in the human rod and cone systems. *Journal of Physiology, London*, 294, 165-179.

6. Geisler, W. S. (1980) Increment-threshold and detection latency in the human rod and cone systems. *Vision Research*, 20, 981-994.

7. Edgell, S. E. and Geisler, W. S. (1980) A set-theoretical random utility model of choice behavior. *Journal of Mathematical Psychology,* 21, 265-278.

8. Geisler, W. S. (1980) Comments on the testing of two prominent dark-adaptation hypotheses. *Vision Research,* 20, 807-811.

9. Geisler, W. S. (1981) Effects of bleaching and backgrounds on the flash response of the cone system. *Journal of Physiology, London,* 312, 413-434.

10. Geisler, W. S. (1983) Mechanisms of visual sensitivity: Backgrounds and early dark adaptation. *Vision Research*, 23, 1423-1432.

11. Geisler, W. S. (1984) The physical limits of acuity and hyperacuity. *Journal of the Optical Society of America A,* 1, 775-782.

12. Geisler, W. S., and Davila, K. D. (1985) Ideal discriminators in spatial vision: Two-point stimuli. *Journal of the Optical Society of America A,* 2, 1483-1497.

13. Geisler, W. S., and Hamilton, D. B. (1986) A sampling theory analysis of spatial vision. *Journal of the Optical Society of America A,* 3, 62-70.

14. Banks, M. S., Geisler, W. S., and Bennett, P. (1987) The physical limits of grating visibility. *Vision Research,* 27, 1915-1924.

15. Geisler, W. S. (1987) SDE software package. *Vision Research,* 27, I.

16. Clark, M., Bovik, A. C., and Geisler, W. S. (1987) Texture segmentation using Gabor modulation/demodulation. *Pattern Recognition Letters,* 6, 261-267.

17. Jordan, J. R., Geisler W. S., and Bovik, A. C. (1987) Chromaticity as a source of information in the human stereo correspondence process. *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics.*

18. Clark, M., Bovik, A. C., and Geisler, W. S. (1987) Experiments with a theory of visual texture segmentation using modulation/demodulation processes. *Proceedings of the IASTED International Symposium on Signal Processing and its Applications.*

19. Clark, M., Bovik, A. C., and Geisler, W. S. (1987) Texture segmentation using a class of narrowband filters. *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing.*

20. Bovik, A. C., Clark, M., and Geisler, W. S. (1987) Computational texture analysis using localized spatial filtering. *Proceedings of Workshop on Computer Vision*, 201-206.

21. Geisler, W. S. (1989) Ideal-observer theory in psychophysics and physiology. *Physica Scripta,* 39, 153-160.

22. Geisler, W. S. (1989) Sequential ideal-observer analysis of visual discrimination. *Psychological Review,* 96, 267-314.

23. Hamilton D. B., Albrecht, D. G., and Geisler, W. S. (1989) Visual cortical receptive fields in monkey and cat: Spatial and temporal phase transfer function. *Vision Research,* 29, 1285-1308.

24. Bovik A. C., Clark M., and Geisler W. S. (1990) Multichannel texture analysis using localized spatial filters. *Pattern Analysis and Machine Intelligence,* 12, 55-73.

25. Jordan J. R., Geisler W. S., and Bovik, A. C. (1990) Color as a source of information in the stereo correspondence process. *Vision Research,* 30, 1955-1970.

26. Davila, K. D., and Geisler, W. S. (1991) The relative contributions of pre-neural and neural factors to areal summation in the fovea. *Vision Research,* 31, 1369-1380.

27. Geisler, W. S., Albrecht, D. G., Salvi, R., and Saunders, S. S. (1991) Discrimination performance of single neurons: rate and temporal-pattern information. *Journal of Neurophysiology,* 66, 334-362.

28. Albrecht, D. G. and Geisler, W. S. (1991) Motion selectivity and the contrast-response function of simple cells in the visual cortex. *Visual Neuroscience,* 7, 531-546.

29. Scharff, L.V. and Geisler, W. S. (1992) Stereopsis at isoluminance in the absence of chromatic aberrations. *Journal of the Optical Society of America A,* 9, 868-876.

30. Geisler, W. S. and Albrecht, D. G. (1992) Cortical neurons: Isolation of contrast gain. *Vision Research,* 32, 1409-1410.

31. Albrecht, D. G. and Geisler, W. S. (1994) Visual cortex neurons in monkey and cat: Contrast response nonlinearities and stimulus selectivity. In: T. Lawton (Ed.), *Computational Vision Based On Neurobiology, SPIE Proceedings,* 2054, 12-31.

32. Geisler, W. S. and Chou, K. L. (1995) Separation of low-level and high-level factors in complex tasks: Visual search. *Psychological Review*, 102, 356-378.

33. Hahn, L. and Geisler, W. S. (1995) Adaptation mechanisms in spatial vision I: Bleaches and backgrounds. *Vision Research*, 35, 1585-1594.

34. Kortum, P. T. and Geisler, W. S. (1995) Adaptation mechanisms in spatial vision II: Flash thresholds and background adaptation. *Vision Research*, 35, 1595-1609.

35. Geisler, W. S. and Albrecht, D. G. (1995) Bayesian analysis of identification performance in monkey visual cortex: Nonlinear mechanisms and stimulus certainty. *Vision Research*, 35, 2723-2730.

36. Klarquist, W.N., Geisler, W.S. & Bovik, A.C. (1995) Maximum-likelihood depth-from-defocus for active vision. *Intelligent Robots and Systems 95. 'Human Robot Interaction and Cooperative Robots', Proceedings. IEEE/RSJ, International Conference on* 3, 374 – 379.

37. Kortum, P.T. and Geisler, W.S. (1996) Implementation of a foveated image-coding system for bandwidth reduction of video images. In B. Rogowitz and J. Allebach (Eds.) *Human Vision and Electronic Imaging. SPIE Proceedings*, 2657, 350-360.

38. Arnow, T. L. and Geisler, W.S. (1996) Visual detection following retinal damage: Predictions of an inhomogeneous retino-cortical model. In: B. Stuck and M. Belkin (Eds.), Laser-Inflicted Eye Injuries: Epidemiology, Prevention, and Treatment, *Proceedings of The International Society for Optical Engineering (SPIE)*, 2674, 119-130.

39. Kuyel, T., Geisler, W. S. and Ghosh, J. (1996) A nonparametric statistical analysis of texture segmentation performance using a foveated image processing similar to the human retina. *Proceedings of the IEEE SSIAI-96*, 207-212.

40. Geisler, W.S. and Albrecht, D. G. (1997) Visual cortex neurons in monkeys and cats: Detection, discrimination and identification. *Visual Neuroscience*, 14, 897-919.

41. Geisler, W.S. and Perry, J.S. (1998) A real-time foveated multi-resolution system for low-bandwidth video communication In: B. Rogowitz and T. Pappas (Eds.), *Human Vision and Electronic Imaging, SPIE Proceedings*, 3299, 294-305.

42. Kuyel, T., Geisler, W.S., Ghosh, J. (1999) Retinally reconstructed images: digital images having a resolution match with the human eye. *IEEE Transactions on Systems Machines and Cybernetics*, 29, 235-243.

43. Kuyel, T., Geisler, W.S., Ghosh, J. (1999) Fast image classification using a sequence of visual fixations. *IEEE Transactions on Systems Machines and Cybernetics*, 29, 304-308.

44. Geisler, W.S. (1999) Motion streaks provide a spatial code for motion direction. *Nature*, 400, 65-69.

45. Geisler, W.S. and Perry, J.S. (1999) Variable resolution displays for visual communications and simulation. *Society for Information Display Technical Digest,* 30, 420-423.

46. Damera-Venkata, N., Kite, T.D., Geisler, W.S. & Evans, B.L. (2000) Image quality assessment based on a degradation model. *IEEE Transactions on Image Processing*, 9, 636-650.

47. Geisler, W.S. and Super, B.J. (2000) Perceptual organization of two-dimensional patterns. *Psychological Review*, 107, 677-708.

48. Geisler, W.S., Thornton, T., Gallogly, D.P. & Perry, J.S. (2000) Image structure models of texture and contour visibility. *Proceeding of the NATO Workshop on Search and Target Acquisition, RTO-MP-45, 15/1 - 15/8.*

49. Geisler, W.S., Perry, J.S., Super, B.J., & Gallogly, D.P. (2001) Edge co-occurrence in natural images predicts contour grouping performance. *Vision Research*, 41, 711-724.

50. Geisler, W.S., Albrecht, D.G., Crane, A. & Stern, L. (2001) Motion direction signals in the primary visual cortex of cat and monkey. *Visual Neuroscience,* 18, 501-516.

51. Geisler, W.S. & Diehl, R.L. (2002) Bayesian natural selection and the evolution of perceptual systems. *Philosophical Transactions of the Royal Society London B,* 357, 419-448.

52. Albrecht, D.G., Geisler, W.S., Frazor, R.A. & Crane, A.M. (2002) Visual cortex neurons of monkeys and cats: Temporal dynamics of the contrast response function. *Journal of Neurophysiology,* 88, 889-914.

53. Geisler, W.S. & Perry, J.S. (2002) Real-time simulation of arbitrary visual fields. *Proceedings of the Eye Tracking Research & Applications Symposium (ACM).* 83-87.

54. Perry, J.S. & Geisler, W.S. (2002) Gaze-contingent real-time simulation of arbitrary visual fields. In: B. Rogowitz and T. Pappas (Eds.), *Human Vision and Electronic Imaging VII, SPIE Proceedings,* 4662, 57-69.

55. Geisler, W.S. & Diehl, R.L. (2003) A Bayesian approach to the evolution of perceptual and cognitive systems. *Cognitive Science,* 27, 379-402.

56. Baudisch, P., DeCarlo, D., Duchowski, A. T., and Geisler, W. S. (2003) Focusing on the Essential: Considering Attention in Display Design, *Communications of the ACM,* 46(3), 60-66.

57. Monga, V., Geisler, W.S. and Evans, B.L. (2003) Linear color-separable human visual system models of vector error diffusion halftoning. *IEEE Signal Processing Letters,* 10, 93-97.

58. Frazor, R.A., Albrecht, D.G., Geisler, W.S. and Crane A.M. (2004) Visual cortex neurons of monkeys and cats: Temporal dynamics of the spatial frequency response function. *Journal of Neurophysiology,* 91, 2607-2627.

59. Tversky, T., Geisler, W.S. & Perry, J.S. (2004) Contour grouping: Closure effects are explained by good continuation and proximity. *Vision Research*, 44, 2769-2777.

60. Najemnik, J. & Geisler, W.S. (2005) Optimal eye movement strategies in visual search. *Nature*, 434, 387-391.

61. Raj, R., Geisler, W.S., Frazor, R.A. & Bovik, A.C. (2005) Contrast statistics for foveated visual systems: Fixation selection by minimizing contrast entropy. *Journal of the Optical Society of America A*. 22, 2039-2049.

62. Ledgeway, T., Hess, R.F. & Geisler, W.S. (2005) Grouping local orientation and direction signals to extract spatial contours: Empirical test of "association field" models of contour integration. *Vision Research*. 45, 2511-2522.

63. Mante, V., Bronin, V., Frazor, R.A., Geisler, W.S. & Carandini, M. (2005) Independence of luminance and contrast in natural scenes and in the early visual system. *Nature Neuroscience*. 8, 1690-1697.

64. Raj, R., Geisler, W.S., Frazor, R.A. & Bovik, A.C. (2005) Natural contrast statistics and the selection of visual fixations. *IEEE International Conference on Image Processing*, 3, 1152-1155.

64. Frazor, R.A. & Geisler, W.S. (2006) Local luminance and contrast in natural images. *Vision Research*, 46, 1585-1598.

66. Geisler, W.S., Perry, J.S. & Najemnik J. (2006) Visual search: The role of peripheral information measured using gaze-contingent displays. *Journal of Vision*. 6, 858-873.

67. Chen Y., Geisler W.S. & Seidemann E. (2006) Optimal decoding of correlated neural population responses in the primate cortex. *Nature Neuroscience*, 9, 1412-1420.

68. Geisler W.S., Albrecht D.G. & Crane A.M. (2007) Responses of cortical neurons to transient changes in local contrast and luminance. *Journal of Neuroscience*, 27, 5063-5067.

69. Tversky, T. & Geisler, W.S. (2007) Optimal sensor design for estimating local velocity in natural environments. In: B. Rogowitz and T. Pappas (Eds.), *Human Vision and Electronic Imaging, SPIE Proceedings*, Vol. 6492.

70. Geisler, W.S. (2008) Visual perception and the statistical properties of natural scenes. *Annual Review of Psychology*, 59, 167-192.

71. Najemnik, J. & Geisler, W.S. (2008) Eye movement statistics in humans are consistent with an optimal search strategy. *Journal of Vision*, 8, 1-14.

72. Chen Y., Geisler W.S. & Seidemann E. (2008) Optimal temporal decoding of V1 population responses in a reaction-time detection task. *Journal of Neurophysiology*, 99, 1366-1379.

73. Geisler, W.S., Perry, J.S. & Ing, A.D. (2008) Natural systems analysis. In: B. Rogowitz and T. Pappas (Eds.), *Human Vision and Electronic Imaging, SPIE Proceedings,* Vol. 6806.

74. Geisler W.S. & Perry J.S. (2009) Contour statistics in natural images: Grouping across occlusions. *Visual Neuroscience*, 26, 109-121.

75. Najemnik, J. & Geisler W.S. (2009) Simple summation rule for optimal fixation selection in visual search. *Vision Research*, 49, 1286-1294.

76. Sit Y.F., Chen Y., Geisler W.S., Miikkulainen R., & Seidemann E. (2009) Complex dynamics of V1 population responses explained by a simple gain-control model. *Neuron*, 64, 943-956.

77. Geisler WS, Najemnik J, & Ing AD (2009) Optimal stimulus encoders for natural tasks. *Journal of Vision*, 9(13):17, 1-16.

78. Michel M.M. & Geisler W.S. (2009) Gaze contingent displays: Analysis of saccadic plasticity in visual search. *Society for Information Display Technical Digest*, 40 (1), 911-914.

79. Ing AD, Wilson AJ & Geisler WS (2010) Region grouping in natural foliage images: Image statistics and human performance. *Journal of Vision*, 10(4):10, 1-19.

80. Geisler WS (2011) Contributions of ideal observer theory to vision research. *Vision Research,* 51, 771-781.

81. Michel MM & Geisler WS (2011) Intrinsic position uncertainty explains detection and localization performance in peripheral vision. *Journal of Vision*, 11(1):18, 1-18.

82. Zhaoping L, Geisler WS & May KA (2011) Human wavelength discrimination of monochromatic light explained by optimal wavelength decoding of light of unknown intensity. *PLoS One*, 6, e19248.

83. Geisler WS & Perry JS (2011) Statistics for optimal point prediction in natural images. *Journal of Vision* 11(12):14, 1–17.

84. Burge J & Geisler WS (2011) Optimal defocus estimation in single natural images. *Proceedings of the National Academy of Sciences,* 108, 16849-16854.

85. McCann B, Hayhoe MM & Geisler WS (2011) Decoding natural signals from peripheral retina. *Journal of Vision,* 11(10):19, 1–11.

86. Geisler WS & Perry JS (2011) High order statistics for point prediction in natural images. *Imaging and Applied Optics Technical Digest*, Optical Society of America, https://doi.org/10.1364/ISA.2011.IMC1

87. Burge J & Geisler WS (2011) Optimal imaged-based defocus estimates from individual natural images. *Imaging and Applied Optics Technical Digest*, Optical Society of America, https://doi.org/10.1364/ISA.2011.IMC2.

88. Burge J & Geisler WS (2012) Optimal defocus estimates from individual digital images for autofocusing a digital camera. In: S. Battiato, B. Rodricks, N. Sampat, F. Imai & F. Xiao (Eds.), *Digital Photography VIII, SPIE-IS&T Proceedings*, Vol. 8299, 1-12. (awarded best paper)

89. Michel, MM, Chen Y, Geisler WS, Seidemann E (2013) An illusion predicted by V1 population activity implicates cortical topography in shape perception. *Nature Neuroscience*, 16, 1477-1483.

90. D'Antona ADD, Perry JS & Geisler WS (2013) Humans make efficient use of natural image statistics when performing spatial interpolation. *Journal of Vision*, 13(14):11, 1-13.

91. Burge J & Geisler WS (2014) Optimal disparity estimation in natural stereo images. *Journal of Vision*, 14(2):1, 1-18.

92. Morgenstern Y, Geisler WS & Murray RF (2014) Human vision is tuned to the diffuseness of natural light. *Journal of Vision*, 14(9):15, 1-18.

93. Bradley C, Abrams J & Geisler WS (2014) Retina-V1 model of detectability across the visual field. *Journal of Vision*, 14(12):22, 1-22.

94. Sebastian S, Burge J, & Geisler WS (2015) Defocus blur discrimination in natural images with natural optics. *Journal of Vision*, 15(5):16, 1–17.

95. Paulun VC, Schutz AC, Michel MM, Geisler WS & Gegenfurtner K (2015) Visual search under scotopic lighting conditions. *Vision Research*, 113, 155–168.

96. Burge J & Geisler WS (2015) Optimal speed estimation in natural image movies predicts human performance. *Nature Communications*, doi: 10.1038/ncomms8900**.**

97. Seidemann E, Chen Y, Chen SC, Bai Y, Mehta P, Kajs BL Geisler WS & Zemelman BV (2016) Calcium imaging with genetically encoded indicators in behaving primates. *eLife*, doi: http://dx.doi.org/10.7554/eLife.16178.001

98. Burge, J., McCann, B. C., & Geisler, W. S. (2016) Estimating 3D tilt from local image cues in natural scenes. *Journal of Vision*, 16(13):2, 1–25, doi:10.1167/16.13.2

99. Sebastian S., Abrams J. & Geisler W.S. (2017) Constrained-sampling experiments reveal principles of detection in natural scenes. *Proceedings of the National Academy of Sciences*, 14:28, E5731–E5740.

100. Geisler WS (2018) Psychometric functions of uncertain template matching observers, *Journal of Vision* 18(2):1, 1–10.

101. Sebastian S & Geisler WS (2018) Decision-variable correlation, *Journal of Vision*, 18(4):3 1-19.

102. McCann BC, Hayhoe MM, & Geisler WS (2018) Contributions of monocular and binocular cues to distance discrimination in natural scenes, *Journal of Vision*, 18(4):12, 1–15.

103. Seidemann E & Geisler WS (2018) Linking V1 activity to behavior, *Annual Review of Vision Science*, 4:14.1–14.24. doi.org/10.1146/annurev-vision-102016-061324.

104. Sammonds JM, Geisler WS & Priebe NJ (2018) Natural image and receptive field statistics predict saccade sizes, *Nature Neuroscience*, 21, 1591-1599.

105. Benvenuti G, Chen Y, Geisler WS, Seidemann E (2018) Scale-invariant visual capabilities explained by topographic representations of luminance and texture in primate V1, *Neuron*, https://doi.org/10.1016/ j.neuron.2018.10.020.

106. Michel MM, Chen Y, Seidemann E & Geisler WS (2018) Nonlinear lateral interactions in V1 population responses explained by a contrast gain control model, *Journal of Neuroscience* , 38(47), 10069-10079. https://doi.org/10.1523/JNEUROSCI.0246-18.2018.

Manuscripts under review

Chapters

107. Shiffrin, R. M., and Geisler, W. S. (1973) Visual recognition in a theory of information processing. In: R. L. Solso (Ed.), *Contemporary Issues in Cognitive Psychology: The Loyola Symposium.* Winston, Washington, D.C.

108. Geisler, W. S. (1981) Mechanisms of dark adaptation. In: W. Makous (Ed.), *Relating Physiology to Psychophysics: Current Problems and Approaches.* Center for Visual Science, University of Rochester.

109. Geisler, W. S. (1987) Ideal-observer analysis of visual discrimination. In: *Frontiers of Visual Science.* National Academy Press, Washington.

110. Geisler, W. S. (1992) Visual performance on natural images: Applications of discrimination models. *Air Force Technical Report,* Armstrong Laboratory, Brooks Air Force Base, San Antonio, Texas.

111. Geisler, W. S. and Banks, M. S. (1995) Visual performance. In M. Bass (Ed.) *Handbook of Optics Vol. 1: Fundamentals, Techniques & Design, 2nd edition.* New York: McGraw-Hill.

112. Geisler, W. S. (1995) Discrimination information in natural radiance spectra. In: *Vision Models for Target Detection and Recognition*, Eli Peli, ed. New York: World Scientific Publishing Co., Inc.

113. Geisler, W. S., & Albrecht, D. G. (2000) Spatial Vision. In K. K. De Valois (Ed.), *Seeing* (2nd ed.). (A volume in the Handbook of Perception and Cognition) New York: Academic Press, pp. 79-128.

114. Geisler, W.S. and Albrecht, D.G. (2000) Spatial vision. In E. Karzdin (Ed.), *Encyclopedia of Psychology*. New York: Oxford.

115. Geisler, W.S. (2003) Ideal observer analysis. In: L. Chalupa and J. Werner (Eds.), *The Visual Neurosciences*. Boston: MIT press. pp. 825-837.

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117. Seidemann, E., Chen, Y. & Geisler, W.S. (2009) Encoding and decoding with neural populations in the primate cortex. In: M.S. Gazzaniga (Ed.) *The Cognitive Neurosciences* IV. Cambridge: MIT Press.

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119. Geisler WS, Burge J, Michel MM & D'Antona ADD (2014) Characterizing the effects of stimulus and neural variability on perceptual performance. In: M.S. Gazzaniga (Ed.) *The Cognitive Neurosciences* V. Cambridge: MIT Press.

Journal Commentaries

120. Geisler, W. S. (1983) A computational view of vision. *Contemporary Psychology*, 28, 581-582.

121. Heeger, D.G, Huk, A., Geisler, W.S., & Albrecht, D.G. (2000) Spikes vs. Bold: What does neuroimaging tell us about neural activity? *Nature Neuroscience*, 3, 631-633.

122. Geisler, W.S. & Kersten, D. (2002) Illusions, perception and Bayes. *Nature Neuroscience*, 5, 508-510.

123. Geisler, W.S. & Murray, R.M (2003) Practice doesn't make perfect. *Nature*, 423, 696-697.

124. Geisler, W.S. & Ringach, D. (2009) Natural systems analysis. *Visual Neuroscience*, 26, 1-3.

Manuscripts in preparation

Sebastian S, Seemiller E & Geisler WS (2018) Pattern identification under partial occlusion. (in preparation).

Abrams J, & Geisler WS (2018) Visual search in natural images (in preparation).

McCann B.C., Burge J., Hayhoe M.M., & Geisler W.S. (2018) Stereo natural images with distance measured at each pixel location. (in preparation)

Geisler WS, Abrams J, & Walshe C (2019) Theory of visual search (in preparation)

Other stuff:

Burge J & Geisler WS (2013) "Of mice and monkeys" image, *Nature*, 502, 156-158.

Technical reports:

Geisler, W. S., and Klarquist, W. N. (1994) Maximum-likelihood method for image deblurring and depth-from-defocus. UT-CVIS-TR-94-008, Austin, Texas: Center for Vision and Image Sciences.

Perry JS & Geisler WS (2013) Natural scene statistics for image denoising. Technical Report UT-CPS-TR-13-001, Austin: Center for Perceptual Systems.

Commentaries on publications:

Burr, D.C. (2000) Motion vision: Are "speed lines" used in human visual motion. *Current Biology* 10, R440-R443.

Maloney, L.T. (2003) Statistical decision theory and evolution. *Trends in Cognitive Science* 7, 473-475.

Trommershauser, J., Glimcher, P.W., & Gegenfurtner, K.R. (2009) Visual processing, learning and feedback in the primate eye movement system. *Trends in Neuroscience*, 32, 583-590.

Ganmor, E., Okun, M. & Lampl, I. (2009) V1 population gains normalization. *Neuron*, 64, 778-780.

Patents

Geisler and Kortum (2001) *Foveated Image Coding System and Method for Bandwidth. Reduction*, U.S. Patent No. 6,252,989.

Geisler and Perry (2011) International Patent Application PCT/US2011/047058: *Using Higher Order Statistics to Estimate Pixel Values in Digital Image Processing to Improve Accuracy and Computation Efficiency.*

Geisler and Burge (2013) *Focus error estimation in images. US* 13/965,758.

Geisler and Perry (2014) *Recursive condition means image denoising,* U.S. Patent No. 8,908,989.

Selected invited lectures:

New York University (1998)
Rochester Symposium (1998)
Society for Information Displays (1999)
NATO workshop on Search & Target Acquisition (1999)
University of Pennsylvania (2000)
Cold Springs Harbor (Summer Seminar Series, Computational Neuroscience: Vision) (2000)
Cold Springs Harbor (Symposium on Natural Signal Statistics) (2000)
FASEB Conference (2000)
National Imaging and Mapping Agency (discussion group) (2000)
Smith-Kettlewell, Bayes Workshop (2001)
Brandeis University (2001)
School of Optometry, University of Houston (2001)
European Conference on Visual Perception (2001)
Conference on Cooperative Dynamics of Neocortex, Big Sky Montana (2001)
OSA and UC Irvine Vision and Color Meeting (2001)
Schepens Eye Research Institute, Harvard Medical School (2001)
Rice University (2002)
Visual Processing of Natural Images Symposium, University of Minnesota (2002)
Cognitive Science Society (2002)
Indiana University (2002)
Northeastern University (2003)
International Workshop on Attention I, San Miniato (2003)
Duke University (2003)
Helmholtz Club and Salk Institute (2003)
University of Rochester (2004)
Gordon Conference on Natural Scenes, Oxford (2004)
Keynote address: IEEE Visualization Conference (2004)
Fall Vision Meeting of the Optical Society of America (2004)
McMaster University (2004)
Annual Neuroscience Symposium UT (2004)
Rutgers University (2005)
University of Southern California (2005)
Vanderbilt University (2005)
York University Centre for Vision Research (2005)
International Workshop on Bioinspired Information Processing, Luebeck (2005)
COSYNE Workshop on Natural Images (2006)
Cold Springs Harbor Summer Seminar Series (Computational Neuroscience: Vision) (2006)
Max Plank Institute, Tubingen (2006)
University of Giessen (2006)
Workshop on Bridging the Gap between Sensation and Motor Control, Marburg (2006)
Keynote address: International Workshop on Attention II, Buenos Aires (2007)

VSS Symposium on Perceptual Organization (2007)
George Sperling Festschrift (2007)
Neural Information Processing Symposium (NIPS) Workshop (2007)
Keynote address: SPIE conference on Human Vision and Electronic Imaging (2008)
Swartz conference on Visual and Auditory Attention (2008)
Cold Springs Harbor Summer Seminar Series (Computational Neuroscience: Vision) (2008)
Plenary Speaker: NSF/NIH meeting of the Collaborative Research in Computational Neuroscience program (2008)
VSS Special Symposium on Action for Perception: functional significance of eye movements for vision (2008)
Hilgard Visiting Professor, Stanford University (2008)
OSA Fall Vision Meeting (2008)
Rensselaer Polytechnic Institute (2008)
Columbia University (2008)
University of California at Santa Barbara: Gottsdanker/Sage Lecture (2009)
COSYNE workshop on Attention (2009)
University of California at Berkley: DeValois Memorial Lecture (2009)
Workshop on Cognitive Science: From Cellular Mechanisms to Computational Theories: Beijing (2009)
Society for Information Displays (2009)
Cornell University (2009)
University of Minnesota (2009)
Summer Course on Computational Neuroscience, Germany (2009)
COSYNE (2010) Lecture honoring Horace Barlow
University of Southern California (2010) Keynote address
Vision Sciences Society (2010)
NSF Workshop UCSD (2010)
Colds Springs Harbor Summer Course in Computational Neuroscience (2010)
National Institutes of Health (2010)
University of Pennsylvania (2010)
University of Chicago (2010) Keynote address
Harvard Medical School (2010)
GCC Conference on Theoretical and Computational Neuroscience (2011)
Cold Springs Harbor Workshop on Neural Response Variability and Cortical Computation (2011)
Optical Society of America Conference on Imaging Systems (2011)
University of Pennsylvania (2011)
MIT (2011)
University of Houston (2011) Keynote lecture
Salk Institute (2012)
Society of Experimental Psychologists (2012)
Origins of Objectivity Workshop, St. Petersburg Russia (2012)
Colds Springs Harbor Summer Course in Computational Neuroscience (2012)
Fall Vision Meeting, Optical Society of America (2012)
European Conference on Visual Perception-ECVP (2013) Plenary lecture
European Conference on Visual Perception-ECVP (2013) Eye Movement Symposium

Cognitive Neurosciences V workshop (2013)
Fall Vision Meeting, Optical Society of America (2013)
Barrow Institute (2014)
Vision Sciences Society (2014)
Rochester Symposium on Restoring Vision (2014)
University of Waterloo (2015)
PRISM6 meeting (2016)
UT INS Dialogues Lecture (2017)
MIT, Brain and Cognitive Sciences (2017)
NYU, SUNY, Columbia (2017)
York CVR conference (2017)
UT CNIRC lecture (2017)
University of Pennsylvania Workshop: Toward a New Theoretical Biology (2018)

Research Websites:

http://www.cps.utexas.edu/natural_scenes/: natural scene statistics papers, demos, databases, and software

http://rcm.cps.utexas.edu/: free image processing website

http://www.svi.cps.utexas.edu/: space variant imaging papers, demos, and software