Curriculum Vitae
David Hoyt Brainard

Personal Information

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Education

1982, Harvard University, A.B. Magna Cum Laude, Physics.
1989, Stanford University, M.S., Electrical Engineering.
1989, Stanford University, Ph.D., Psychology.

Employment

1982-83, Aox Incorporated, Hopkinton, MA, Systems Programmer.
1990-91, University of Rochester, Center for Visual Science, Post-Doctoral Fellow.
1991-1995, University of California at Santa Barbara, Psychology, Assistant Professor.
1995-1999, University of California at Santa Barbara, Psychology, Associate Professor.
1999-2001, University of California at Santa Barbara, Psychology, Psychology, Professor.
2001-present, University of Pennsylvania, Psychology, Professor.
2005-present, University of Pennsylvania, Chair of Psychology.

Awards and Honors

1978, National Merit Scholar.
1985-88, NSF Graduate Fellowship.
1987, ARVO Travel Fellowship.
1987, Cold Spring Harbor Laboratory Short Course Fellowship.
1990-91, NIH/NEI National Research Service Award, Individual Post-Doctoral Fellowship.
1991, Best Student Paper, Society for Information Display Annual Meeting.
1993, Honorable Mention, NSF Young Investigator Award Program.
2000, Fellow of the Optical Society of America.
2006, Inter-Society Color Council, Macbeth Award.
2009, Fellow of the Association for Psychological Science.

Extramural Support

2009-2010, NIH/NEI P30 EY00158, "Core grant for vision research", PI.
1992-2011, NIH/NEI RO1 EY010016, "Color constancy", PI.
2005-2010, NIH/NIMH RO1 MH70850 Visual knowledge of objects", Co-I (Sharon Thompson-Schill, PI).
2000-2001, Sponsor, NIH/NEI NRSA post-doctoral fellowship awarded to Manoel Rowe.
2000-2001, Agilent Coproration, "Research in digital imaging", PI.
1995-2000, Hewlett-Packard Corporation, "Research in digital imaging", PI.
1996-99, Sponsor, NIH/NEI NRSA post-doctoral fellowship awarded to James Kraft.
1993-95, NSF, Instructional Laboratory Instrumentation, "Laboratory in human information processing", PI.

Intramural Grant Support

1991-95, UCSB Academic Senate Travel Grants.
1991, UCSB Academic Senate Research Grant.
1992, UCSB Instructional Development Minigrant.
1993, UCSB Academic Senate Research Grant.
1994, UCSB Academic Senate Research Grant (with G. Jacobs).
1994, UCSB Instructional Development Minigrant.

Publications

For updated list, see http://color.psych.upenn.edu/brainard/pubs.html

1. Brainard, D.H. and Wandell, B.A. (1986). Analysis of the retinex theory of color vision. *Journal of the Optical Society of America A,* **3**, 1651-1661. Reprinted in Color (Physics-based Vision/ Principles and Practice), Healey, G.E., Shafer, S. A. and Wollf, L.B. (eds.), Jones and Bartlett Publishers, Boston, MA, 1992.

2. Brainard, D.H. (1989). Calibration of a computer controlled color monitor. *Color Research and Application*, **14**, 23-34.

3. Brainard, D.H., Wandell, B.A., and Cowan, W. (1989). Black light: how sensors filter spectral variations of the illuminant. *IEEE Transactions on Biomedical Engineering*, **36**, 140-149. Erratum published in *IEEE Transactions on Biomedical Engineering*, **36**, 572.

4. Wandell, B.A. and Brainard, D.H. (1989). Towards cross-media color reproduction. *Proceedings of the OSA Applied Vision Topical Meeting*, San Francisco, CA.

5. Brainard, D.H. (1989). Letter to the editor. *Color Research and Application*, **15**, 270.

6. Brainard, D.H. and Wandell, B.A. (1990). Calibrated processing of image color. *Color Research and Application*, **15**, 266-271.

7. Brainard, D.H. (1990). Calibrated color image processing. *Proceedings of SPSE's 43rd Annual Conference*, 171-173.

8. Poirson, A.B., Wandell, B.A., Varner, D. and Brainard, D.H. (1990). Surface characterizations of color thresholds. *Journal of the Optical Society of America A*, **7**, 783-789.

9. Brainard, D.H. and Wandell, B.A. (1990). The effect of the illuminant on color appearance. *Proceedings of the SPIE/SPSE Symposium on Electronic Imaging*, **1250**, 119-130.

10. Brainard, D.H. and Wandell, B.A. (1991). Evaluation of CIE Luv and CIE Lab as perceptual image representations. *Society for Information Display International Symposium Technical Digest*, **22**, 799-801.

11. Brainard, D.H. and Wandell, B.A. (1991). A bilinear model of the illuminant's effect on color appearance. In Computational Models of Visual Processing, Landy, M. and Movshon, J. A. (eds.), MIT Press.

12. Williams, D.R., Sekiguchi, N., Haake, W., Brainard, D.H., and Packer O. (1991). The cost of trichromacy for spatial vision. In Advances in Understanding Visual Processes: Convergence of Neurophysiological and Psychophysical Evidence, Lee, B. and Valberg, A. (ed.), Plenum Press.

13. Brainard, D.H. and Wandell, B.A. (1992). Asymmetric color matching: how color appearance depends on the illuminant. *Journal of the Optical Society of America A*, **9**, 1433-1448.

14. Brainard, D.H. and Williams, D.R. (1992). Spatial reconstruction of signals from short-wavelength cones. *Optical Society of America Topical Meeting: Advances in Color Vision. Digest Series*, **4** (1992), 211-213.

15. Sekiguchi, N. Williams, D.R. and Brainard, D.H. (1992) Contrast sensitivity for isoluminant and isochromatic interference fringes.*Optical Society of America Topical Meeting: Advances in Color Vision. Digest Series*, **4** (1992), 72-73.

16. Brainard, D.H. and Williams, D.R. (1992). Spatial reconstruction of signals from short-wavelength cones. *Vision Research*, **33**, 105-116.

17. Brainard, D.H. (1993). Perceptual variability as a fundamental axiom of perceptual science: comments on Ashby and Lee. In Foundations of Perceptual Theory, S. C. Masin (ed), Elsevier Science Publishers.

18. Brainard, D.H., Wandell, B.A., and Chichilnisky, E. J. (1993). Color constancy: from physics to appearance. *Current Directions in Psychological Science*, **2**, 165-170.

19. Sekiguchi, N., Williams, D.R., and Brainard, D.H. (1993). Aberration-free measurements of the visibility of isoluminant gratings. *Journal of the Optical Society of America A*, **10**, 2105-2117.

20. Sekiguchi, N., Williams, D.R., and Brainard, D.H. (1993). Efficiency for detecting isoluminant and isochromatic interference fringes. *Journal of the Optical Society of America A*, **10**, 2118-2133.

21. Williams, D.R., Sekiguchi, N., and Brainard, D.H. (1993). Color, contrast sensitivity, and the cone mosaic. *Proc. Nat. Acad. Sci. USA*, **90**, 9770-9777.

22. Brainard, D.H. and Freeman, W.T. (1994). Bayesian method for recovering surface and illuminant properties from photoreceptor responses. *Proceedings of the SPIE Conference on Human Vision, Visual Processing, and Display V*, **2179**, 364-376.

23. Brainard, D.H. (1994). Bayesian method for reconstructing color images from trichromatic samples. *Proceedings of the IS&T 47th Annual Meeting*, Rochester, NY, 375-380.

24. Williams, D.R., McMahon, M, Brainard, D.H., and Navarro, R. (1994). Comparison of noninvasive measures of the optical quality of the eye. *Proceedings of the OSA Topical Meeting: Vision Science and its Applications. Digest Series,* **2** (1994), 68-71.

25. Williams, D.R. Brainard, D.H., McMahon, M., and Navarro, R. (1994). Double pass and interferometric measures of the optical quality of the human eye. *Journal of the Optical Society of America A*, **11**, 3123-3135.

26. Brainard, D.H. (1995). Colorimetry. In OSA Handbook of Optics: Volume 1. Fundamentals, Techniques, and Design, M. Bass (ed), McGraw-Hill, Inc., New York.

27. Freeman, W.T. and Brainard D.H. (1995). Bayesian decision theory, the maximum local mass estimate, and color constancy. *Proceedings of the Fifth International Conference on Computer Vision.,* 210-217.

28. Brainard, D. H. and Sherman, D. (1995). Reconstructing images from trichromatic samples: from basic research to practical applications. *Proceedings of the 3rd IS&T/SID Color Imaging Conference*, Scottsdale, AZ, pp. 4-10.

29. Brainard, D. H. and Ishigami, K. (1995). Factors influencing the appearance of CRT colors. *Proceedings of the 3rd IS&T/SID Color Imaging Conference*, Scottsdale, AZ, pp. 62-66.

30. Williams, D. R., Artal, P., Navarro, R., McMahon, M. J. and Brainard, D. H. (1996). Off-axis optical quality and retinal sampling in the human eye. *Vision Research* **36**, 1104-1114.

31. Speigle, J. M. and Brainard, D. H. (1996). Luminosity thresholds: effects of test chromaticity and ambient illumination. *Journal of the Optical Society of America A* **13**, 436-451.

32. Brainard, D. H. (1996). Cone contrast and opponent modulation color spaces. In Kaiser and Boynton, Human Color Vision, 2nd edition, Optical Society of America, Washington, DC.

33. Speigle, J. M. and Brainard, D. H. (1996). Is color constancy task independent? *Proceedings of the 4th IS&T/SID Color Imaging Conference,* Scottsdale, AZ, pp. 167-172.

34. Brainard, D. H. (1997). The Psychophysics Toolbox. *Spatial Vision*, 10, 433-436.

35. Chen, C. C., Foley, J. M. and Brainard, D. H. (1997). Detecting chromatic patterns on chromatic pattern pedestals. *IS&T Proceedings: Optics and Imaging in the Information Age* ,19-24.

36. Brainard, D. H. and Freeman, W. T. (1997). Bayesian color constancy. *Journal of the Optical Society of America A ,* 14, 1393-1411.

37. Brainard, D. H., Brunt, W. A., and Speigle, J.M. (1997). Color constancy in the nearly natural image. 1. Asymmetric matches. *Journal of the Optical Society of America A ,* 14, 2091-2110.

38. Vora, P. L., Harville, M. L., Farrell, J. E., Tietz, J. D., and Brainard, D. H. (1997). Image capture: synthesis of sensor responses from multispectral images. Proceedings of the 1997 IS&T/SPIE Conference on Electronic Imaging, (San Jose, CA, February 10-14, 1997), 3018, 2-11.

39. Vora, P. L., Farrell, J. E., Tietz, J. D., and Brainard, D. H. (1997). Linear models for digital cameras. Proceedings of the 1997 IS&T 50th Annual Conference, (Cambridge, MA, May 18-23, 1997), 377-382.

40. Brainard, D. H. (1998). Color constancy in the nearly natural image. 2. Achromatic loci. *Journal of the Optical Society of America A ,* 15, 307-325.

41. Fleishman, L. J., McClintock, W. J., D'Eath, R. B., Brainard, D. H. and Endler, J. A. (1998). Colour perception and the use of video playback experiments in animal behavior. *Animal Behavior*, 56, 1035-1040.

42. Brainard, D. H. (1999). Color Vision. In the MIT Encyclopedia of the Cognitive Sciences, R. Wislon and F. Keil (eds.). See also http://mitpress.mit.edu/MITECS/work/brainard.html.

43. Kraft, J. M. and Brainard, D. H. (1999). Mechanisms of color constancy under nearly natural viewing. *Proceedings of the National Academy of Sciences USA.,* 96, 307-312. PMCID: PMC15135. [For a commentary on this paper, see Hurlbert, A. (1999). Is color constancy real? *Current Biology*,12, R558-R561.]

44. Speigle, J. M. and Brainard, D. H (1999). Predicting color from gray: the relationship between achromatic adjustment and asymmetric matching, *Journal of the Optical Society of America A* , 16, 2370-2376.

45. Brainard, D. H, Calderone, J. B., Nugent, A. K., and Jacobs, G. H. (1999). Flicker ERG responses to stimuli parametrically modulated in color space. *Investigative Ophthalmology and Visual Science*, 40, 2840-2847.

46. Brainard, D. H., Roorda, A., Yamauchi, Y. Calderone, J. B., Metha, A., Neitz, M., Neitz, J., Williams, D. R., and Jacobs, G. H. (2000). Functional consequences of the relative numbers of L and M cones. *Journal of the Optical Society of America A,* 17, 607-614. Erratum published in *Journal of the Optical Society of America A,* 17, 607-614, 17, 1684.

47. Chen, C.C., Foley, J. M., and Brainard, D. H. (2000). Detection of chromoluminance patterns on chromoluminance pedestals I: Threshold Measurements. *Vision Research*, 40, 773-788.

48. Chen, C.C., Foley, J. M., and Brainard, D. H. (2000). Detection of chromoluminance patterns on chromoluminance pedestals II: Model. *Vision Research*, 40, 789-803.

49. Dacey, D, Packer, O.S., Diller, L., Brainard, D., Peterson, B., and Lee, B. (2000). Center surround receptive field structure of cone bipolar cells in primate retina. *Vision Research*, 40, 1801-1811.

50. Brainard, D.H. (2000). How to write an effective manuscript review. Optics and Photonics News, June 2000, 42-43.

51. Delahunt, P.B. & Brainard, D.H. (2000). Control of chromatic adaptation: signals from separate cone classes interact. *Vision Research*, 40, 2885-2903. Erratum published in 2008: *Vision Research*, 48, 1186.

52. Packer, O., Diller, L.C., Verweij, J., Lee, B.B., Pokorny, J., Williams, D.R., Dacey, D.M., and Brainard, D.H. (2001). Characterization and use of a digital light projector for vision research. *Vision Research*, 41, 427-439.

53. Vora, P.L., Farrell, J.E., Tietz, J.D., and Brainard, D.H. (2001). Image capture: simulation of sensor responses from hyperspectral images. *IEEE Transactions on Image Processing*, 10, 307-316.

54. Longere, P. and Brainard, D. H. (2001). Simulation of digital camera images from hyperspectral input. In Vision Models and Applications to Image and Video Processing. C. van den Branden Lambrecht (ed.), Kluwer. 123-150.

55. Brainard, D. H. (2001). Color vision theory. In International Encyclopedia of the Social and Behavioral Sciences, N. J. Smelser & P. B. Baltes (eds.), Elsevier, Oxford, UK, Vol.4, 2256-63.

56. Longere, P., Delahunt, P. B., Zhang, X., and Brainard, D. H. (2002). Perceptual assessment of demosaicing algorithm performance. *Proceedings of the IEEE*, 90, 123-132.

57. Rutherford, M. D. and Brainard, D. H. (2002). Lightness constancy: a direct test of the illumination estimation hypothesis. *Psychological Science*, 13, 142-149.

58. Kraft, J. M., Maloney, S. I., and Brainard, D. H. (2002). Surface-illuminant ambiguity and color constancy: effects of scene complexity and depth cues. *Perception*, 31, 247-263.

59. Brainard, D. H., Pelli, D.G., and Robson, T. (2002). Display characterization. In Encylopedia of Imaging Science and Technology. J. Hornak (ed.), Wiley: 172-188.

60. Reese, L. A., Ashby, F. G. and Brainard, D. H. (2002). What makes a categorization task difficult? *Perception and Psychophysics*, 64, 570-583.

61. Yamauchi, Y., Williams D. R., Brainard D. H., Roorda, A., Carroll, J., Neitz, M., Neitz, J., Calderone, J. B., Jacobs, G. H. (2002). What determines unique yellow, L/M cone ratio or visual experience? Paper presented at the 9th Congress of the International Colour Association, *Proceedings of SPIE*, 4421, 275-278.

62. Brainard, D. H. (2003). Color appearance and color difference specification. In The Science of Color, 2cd edition, S. K. Shevell (ed.), Optical Society of America, Washington D.C., 191-216.

63. Brainard, D. H., Kraft, J. M., and Longere, P. (2003). Color constancy: developing empirical tests of computational models. In Colour Perception: From Light To Object, R. Mausfeld and D. Heyer (eds.), Oxford University Press, 307-334.

64. Brainard, D. H. (2003). Surface color appearance in nearly natural images: commentary on Maloney and Yang. In Colour Perception: Mind and the Physical World, R. Mausfeld and D. Heyer (eds.), Oxford University Press, 359-360.

65. Singh, B., Freeman, W. T., and Brainard, D. (2003). Exploiting spatial and spectral image regularities for color constancy. Paper presented at the 3rd Int'l Workshop on Statistical and Computational Theories of Vision, Nice France, October 12, 2003 (http://department.stat.ucla.edu/~yuille/meetings/2003_workshop.php).

66. Brainard, D. H. (2004). Color constancy. In The Visual Neurosciences, L. Chalupa and J. Werner (eds.), MIT Press, 948-961.

67. Delahunt, P. B. and Brainard, D. H. (2004). Does human color constancy incorporate the statistical regularity of natural daylight? Journal of Vision, 4, 57-81, http://journalofvision.org/4/2/1/, doi:10.1167/4.2.1.

68. Brainard, D. H. & Maloney, L. T. (2004). Perception of color and material properties in complex scenes. Journal of Vision, 4, issue 9, ii-iv, http://journalofvision.org/4/9/i/, doi:10.1167/4.9.i.

69. Bloj, M., Ripamonti, C., Mitha, K., Hauck, R., Greenwald, S., & Brainard, D. H. (2004). An equivalent illuminant model for the effect of surface slant on perceived lightness. Journal of Vision, 4, 735-746, http://journalofvision.org/4/9/6/, doi:10.1167/4.9.6.

70. Ripamonti, C., Bloj, M., Hauck, R., Mitha, K., Greenwald, S., Maloney, S. I., & Brainard, D. H. (2004). Measurements of the effect of surface slant on perceived lightness. Journal of Vision, 4, 747-763, http://journalofvision.org/4/9/7/, doi:10.1167/4.9.7.

71. Delahunt, P. B. & Brainard, D. H. (2004). Color constancy under changes in reflected illumination. Journal of Vision, 4, 764-778, http://journalofvision.org/4/9/8/, doi:10.1167/4.9.8.

72. Zhang, X. and Brainard, D. H. (2004). Bayesian color correction method for non-colorimetric digital image sensors. Proceedings of the 12th IS&T/SID Color Imaging Conference, Scottsdale, AZ, 308-314.

73. Zhang, X. and Brainard, D. H. (2004). Estimation of saturated pixel values in digital color imaging. Journal of the Optical Society of America A, 21, 2301-2310. PMCID: PMC1815481.

74. Delahunt, P. B., Zhang, X., and Brainard, D. H. (2005). Perceptual image quality: effects of tone characteristics. Journal of Electronic Imaging, 14, 023003, 1-12. PMCID: PMC1773023.

75. Hillis, J. M. & Brainard, D. H. (2005). Do common mechanisms of adaptation mediate color discrimination and appearance? Uniform backgrounds. Journal of the Optical Society of America A, 22, 2090-2106. PMCID: PMC1815483.

76. Xiao, B. and Brainard D. H. (2006). Color perception of 3D objects: constancy with respect to variation of surface gloss. *Proceedings of ACM Symposium on Applied Perception in Graphics and Visualization (APGV06)*, July 28-29, 2006, Boston, MA, 63-68.

77. Brainard, D. H., Longere, P., Delahunt, P. B., Freeman, W. T., Kraft, J. M., Xiao, B. (2006). Bayesian model of human color constancy. Journal of Vision, 6, 1267-1281, http://journalofvision.org/6/11/10/, doi:10.1167/6.11.10. PMCID: PMC2396883.

78. Yin, L., Smith, R. G., Sterling, P. and Brainard, D. H. (2006). Chromatic properties of horizontal and ganglion cell responses follow a dual gradient in cone opsin expression, 26, 12351-12361, doi:10.1523/JNEUROSCI.1071-06.2006. PMCID: PMC1815484.

79. Aguirre, G. K., Komaromy, A. M., Cideciyan, A. V., Brainard, D. H., Aleman, T. S., Roman, A. J., Avants, B. B., Gee, J. C., Korczykowski, M., Hauswirth, W. W., Acland, G. M., Aguirre, G. D., Jacobson, S. G. (2007). Canine and human visual cortex intact and responsive despite early retinal blindness from RPE65 mutation. PLOS Medicine, 4, 1117-1128, doi:10.1371/journal.pmed.0040186. PMCID: PMC1896221.

80. Hillis, J. M. and Brainard, D. H. (2007). Do common mechanisms of adaptation mediate color discrimination and appearance? Contrast adaptation. Journal of the Optical Society of America A, 24, 2122-2133. PMCID: PMC2773246.

81. Abrams, A. B., Hillis, J. M., and Brainard, D. H. (2007). The relation between color discrimination and color constancy: when is optimal adaptation task dependent? Neural Computation, 19, 2610-2637. PMID: 17716005; PMCID: PMC2671007.

82. Hillis, J. M. and Brainard D. H. (2007). Distinct mechanisms mediate visual detection and identification. Current Biology, 17, 1714-1719, doi:10.1016/j.cub.2007.09.012. PMCID: PMC2772872.

83. Radoeva, P. D., Prasad, S., Brainard, D. H., and Agurre, G. K. (2008). Neural activity in V1 reflects unconcious visual performance in a case of blindsight. Journal of Cognitive Neuroscience, 20, 1927-1939. doi:10.1162/jocn.2008.2013. (Epub ahead of print, doi:10.1162/jocn.2008.20139.) PMID: 18416678; PMCID: PMC2773243.

84. Brainard, D. H., Williams, D. R., & Hofer, H. (2008). Trichromatic reconstruction from the interleaved cone mosaic: Bayesian model and the color appearance of small spots. Journal of Vision, 8(5):15, 1-23, http://journalofvision.org/8/5/15/, doi:10.1167/8.5.15. PMID: 18842086; PMCID: PMC2671890.

85. Xiao, B. & Brainard, D. H. (2008). Surface gloss and color perception of 3D objects. Visual Neuroscience, 25, 371-385. doi:10.10170/S0952523808080267. PMID: 18598406; PMCID: PMC2538579.

86. Manning, J. R. & Brainard, D. H. (2009). Optimal design of photoreceptor mosaics: Why we do not see color at night. Visual Neuroscience, Visual Neuroscience, 26, 5-19. (Epub ahead of print, doi:10.1017/S095252380808084X.) PMID: 19193250; PMCID: PMC2671005.

87. Yin, L., Smith, R. G., Sterling, P., & Brainard, D. H. (2009). Physiology and morphology of color-opponent ganglion cells in a retina expressing a dual gradient of S and M opsins. Journal of Neuroscience, 29, 2706-2724. PMID: 19261865; PMCID: PMC2677103.

88. Allred, S. R. & Brainard, D. H. (2009). Contrast, constancy, and measurements of perceived lightness under parametric manipulation of surface slant and surface reflectance. Journal of the Optical Society of America A, 26, 949-961. PMID: 19340270; PMCID: PMC2714230.

89. Brainard, D. H. (2009). Bayesian approaches to color vision. The Cognitive Neurosciences, Fourth Edition (M. S. Gazzaniga, ed.). MIT Press, Cambridge, MA, 395-408.

Patents

1. Zhang, X. and Brainard, D. H. (2004). Method and apparatus for estimating true color values for saturated color values in digitally captured image data. US Patent 6,731,794. Issued May 4, 2004.

Reports

1. Brainard, D.H. and Wandell, B.A. (1989). The color analysis package. *Stanford Applied Psychology Laboratory Report*, 89-3.

2. Brainard, D.H. (1995). An ideal observer for appearance: reconstruction from samples. UCSB Vision Labs Tech Report 95-1, Department of Psychology, UC Santa Barbara, Santa Barbara, CA.

3. Vora, P. L., Farrell, J. E., Tietz, J. D., and Brainard, D. H. (1997) Digital color cameras. 1. Response models. Hewlett-Packard Laboratory Technical Report, Number HPL-97-53.

4. Vora, P. L., Farrell, J. E., Tietz, J. D., and Brainard, D. H. (1997) Digital color cameras. 2. Spectral response. Hewlett-Packard Laboratory Technical Report, Number HPL-97-54.

5. Vora, P. L., Farrell, J. E., Tietz, J. D., and Brainard, D. H. (1998) Image Capture: Modelling and calibration of sensor responses and their synthesis from multispectral images. Hewlett-Packard Laboratory Technical Report, Number HPL-98-187.

Abstracts

1. Brainard, D.H. and Wandell, B. A. (1987). Spatial integration of chromatic information. *Investigative Ophthalmology and Visual Science, Supplement*, **28**, 92.

2. Brainard, D.H. and Wandell, B. A. (1988). Classification measurement of color appearance. *Investigative Ophthalmology and Visual Science, Supplement*, **29**, 162.

3. Brainard, D.H. and Wandell, B.A. (1988). Prediction of the illuminant's effect on color appearance. *Optical Society of America Annual Meeting*, Santa Clara, CA.

4. Brainard, D.H., Wandell, B.A. and Poirson, A. B (1989) Discrete analysis of spatial and spectral aliasing. Investigative Ophthalmology and Visual Science, Supplement,**30**, 53.

5. Brainard, D.H. and Williams, D.R. (1991). Combination of spatial information from separate cone submosaics. Investigative Ophthalmology and Visual Science, Supplement, **32**, 1023.

6. Hayhoe, M., Wenderoth, P., Lynch, E. and Brainard, D.H. (1991). Adaptation mchanisms in color appearance. *Investigative Opthalmology and Visual Science, Supplement* **32**: 1023.

7. Sekiguchi, N., Williams, D.R., and Brainard, D.H. (1991). Foveal resolution limit for chromatic interference fringes. *Optical Society of America Annual Meeting*, San Jose, CA.

8. Brainard, D.H., Williams, D.R., and Sekiguchi, N. (1992). Supra-Nyquist resolution in the extra-fovea? *Investigative Ophthalmology and Visual Science, Supplement*, **33**, 824.

9. Artal, P., Navarro, R., Brainard, D.H., Galvin, S., and Williams, D.R. (1992). Off-axis optical quality of the eye and retinal sampling. *Investigative Ophthalmology and Visual Science, Supplement*, **3**, 1342

10. Brainard, D.H. and Williams, D.R. (1993). Bayes estimator for reconstruction from samples. *Investigative Ophthalmology and Visual Science, Supplement*, **34**, 777.

11. Sekiguchi, N., Williams, D.R., and Brainard, D.H. (1993). Neural limits on isoluminant and isochromatic contrast sensitivity. *Investigative Ophthalmology and Visual Science, Supplement*, **34**, 912.

12. Brainard, D.H. and Speigle, J.M. (1994). Achromatic loci measured under realistic viewing conditions. *Investigative Ophthalmology and Visual Science, Supplement*, **35**, 1328.

13. Freeman, W.T. and Brainard, D.H. (1994). Bayesian method for recovering surface and illuminant properties from photosensor responses. *Investigative Ophthalmology and VisualScience, Supplement*, **35**, 1656.

14. Speigle, J.M. and Brainard, D.H. (1994). Fluorence thresholds vary with the illumination. Investigative Ophthalmology and Visual Science, Supplement, **35**, 1656.

15. Sekiguchi, N., Williams, D.R., and Brainard D.H. (1994). Neural limits on human spatial contrast sensitivity. *Frontiers in Information Optics,Topical Meeting of the International Commission for Optics Meeting Digest*, 122.

16. Williams, D.R., Brainard, D.H., McMahon, M., and Navarro, R. (1994). Comparison of noninvasive measures of the optical quality of the human eye. *Frontiers in Information Optics,Topical Meeting of the International Commission for Optics Meeting Digest*, 125.

17. Alfonso-Reese, L.A., Ashby, F.G., and Brainard, D.H. (1994). Categorization efficiency measured with trivariate stimuli. *Annual Meeting of the Society for Mathematical Psychology*, Seattle, WA.

18. Brainard, D.H. (1994). Color constancy in the natural image. *Optical Society of America Annual Meeting*, Dallas, TX.

19. Brainard, D.H. (1995), 90 degrees of separation. *Optical Society of America Annual Meeting*, Portland, OR.

20. Sherman, D. and Brainard, D. H. (1995), Evaluation of a Bayesian method for reconstructing polychromatic images from interleaved color sampling mosaics. *Optical Society of America Annual Meeting*, Portland, OR.

21. Freeman, W. T. and Brainard D. H. (1995). Bayesian decision theory applied to color constancy. *Optical Society of America Annual Meeting*, Portland, OR.

22. Brainard, D. H., Calderone, J. B. , and Jacobs, G. H. (1995), Contrast flicker ERG responses to cone isolating stimuli. *Society for Neuroscience Annual Meeting*, San Diego, CA.

23. Brainard, D. H. and Brunt, W. A. (1996). The equivalent illuminant. *Investigative Ophthalmology and Visual Science, Supplement* **37**, S648.

24. Speigle, J. M., Brunt, W. A. and Brainard, D. H. (1996). Color constancy measured using three tasks. *Investigative Ophthalmology and Visual Science, Supplement* **37**, S1064.

25. Chen, C.C., Foley, J. M, and Brainard, D. H. (1996). A masking analysis of the chromatic properties of pattern detection mechanisms. *Investigative Ophthalmology and Visual Science, Supplement* **37**, S1064.

26. Brainard, D.H., Rutherford, M. D., Kraft, J. M. (1997). Color constancy compared: experiments with real images and color monitors. *Investigative Ophthalmology and Visual Science, Supplement*, 38, S476.

27. Kraft, J. M. and Brainard, D. H. (1997). What cues mediate color constancy*?. Investigative Ophthalmology and Visual Science, Supplement*, 38, S898.

28. Speigle, J.M. and Brainard, D.H. (1997). Matching, scaling, and naming reveal a common appearance representation. *Investigative Ophthalmology and Visual Science, Supplement*, 38, S898.

29. Chen, C. C., Foley, J. M. and Brainard, D.H. (1997). A three-mechanism model of chromo-luminance pattern masking. *Investigative Ophthalmology and Visual Science, Supplemen*t, 38, S255.

30. Brainard, D. H., Calderone, J. B., Nugent, A. K., and Jacobs, G. H. (1997). Flicker ERG responses to cone isolating stimuli. *Optical Society of Americal Annual Meeting*, Long Beach, CA.

31. McClintock, W. J. Fleishman, L. J., Brainard, D. H., and Endler, J. A. (1997). Video playback methods: problems and pitfalls. *International Ethological Conference XXV*, Vienna, Austria.

32. Kraft, J. M. and Brainard, D. H. (1998). Illuminant-surface ambiguity and color constancy. *Investigative Ophthalmology and Visual Science, Supplement*, 39, S154.

33. Egan, P.B. and Brainard, D.H. (1999). The relationship between lightness and color appearance: are context effects for each photoreceptor class independent? *Investigative Ophthalmology and Visual Science, Supplement*, 40, S987.

34. Kraft, J. M. and Brainard, D .H. (1999). The role of cues to depth and scene articulation in color constancy. *European Conference on Visual Perception*, Trieste, Italy.

34. Brainard, D. H. Calderone, J. B., Jacobs, G. H., Roorda, A., Neitz, M., Neitz, J., and Williams, D. R. (1999). Functional consequences of individual variation in relative L/M cone numerosity. *Optical Society of America Annual Meeting*, Santa Clara, CA. Abstract available online at http://www.osa.org/mtg_conf/Annual/1999/AP/gen/abstract.htm.

35. Kraft, J. M. and Brainard, D. H. (1999). Color constancy measured under full-cue and reduced-cue conditions. *Optical Society of America Annual Meeting*, Santa Clara, CA. Abstract available online at http://www.osa.org/mtg_conf/Annual/1999/AP/gen/abstract.htm.

36. Egan, P. D. and Brainard, D. H. (2000). Parametric models of asymmetric color matching. *Investigative Ophthalmology and Visual Science, Supplement*, 41, S237.

37. Rutherford, M. D. and Brainard, D. H. (2000). The role of illumination perception in color constancy. *Investigative Ophthalmology and Visual Science, Supplement*, 41, S525.

38. Yamauchi, Y, Williams, D. R., Brainard, D. H., Calderone, J.B., Roorda, A., Neitz, M., Neitz, J., and Jacobs, G.H. (2000). Is unique yellow determined by the relative numbers of L and M cones? *Investigative Ophthalmology and Visual Science, Supplement*, 41, S526.

39. Rowe, M.P. and Brainard, D. H. (2000). Psychophysical flicker matches for comparison with ERG recordings *Investigative Ophthalmology and Visual Science, Supplement*, 41, S712.

40. Longere, P., Kraft, J. M., & Brainard, D.H. (2001). Bayesian model of human color constancy. *Journal of Vision*, 1, 62a, http://journalofvision.org/1/3/62, DOI 10.1167/1.3.62.

41. Delahunt, P.B. & Brainard, D. H (2001). Color constancy varies for different illumination changes. UCI-OSA Color and Vision Meeting, Irvine, CA.

42. Brainard, D.H. (2001). Computational mechanisms of color constancy.
UCI-OSA Color and Vision Meeting, Irvine, CA.

43. Delahunt, P.B. & Brainard, D. H. (2002). Comparison of color constancy with respect to illumination changes induced by distinct physical processes. VSS Annual Meeting, Sarasota, FL. Journal of Vision, 2, 151a, http://journalofvision.org/2/7/151/, DOI 10.1167/2.7.151.

44. Brainard, D. H. & Maloney, S. I. (2002). The effect of object shape and pose on perceived lightness. VSS Annual Meeting, Sarasota, FL. Journal of Vision, 2, 552a, http://journalofvision.org/2/7/552/, DOI 10.1167/2.7.552.

45. Ripamonti, C., Bloj, M., Hauck, R. E., Mitha, K., & Brainard, D. H. (2003). Object lightness constancy: effects of object pose and shape. VSS Annual Meeting, Sarasota, FL. Journal of Vision, 3, 295a, http://journalofvision.org/3/9/295/, DOI10.1167/3.9.295.

46. Hillis, J. M. & Brainard, D. H. (2003). Cone inputs controlling color context effects: Detection and appeara.nce. Journal of Vision, 3, 702a, http://journalofvision.org/3/9/702/, DOI10.1167/3.9.702.

47. Ripamonti, C., Bloj, M., Mitha, K., Hauck, R. E.,Greenwald, S. H., & Brainard, D. H. (2003). Scene geometry and perceived lightness of real objects: effects of instructions. European Conference on Visual Perception, Paris. http://www.perceptionweb.com/ecvp03/1032.html.

48. Bloj, M., Ripamonti, C., Mitha, K., Hauck, R. E.,Greenwald, S. H., & Brainard, D. H. (2003). Scene geometry and perceived lightness of real objects: Parametricmeasurements and models. European Conference on Visual Perception, Paris. http://www.perceptionweb.com/ecvp03/1074.html.

49. Hillis, J. M. & Brainard, D. H. (2003). Cone inputs controlling color context effects: detection and appearance. OSA Fall Vision Meeting. Journal of Vision, 3, 33a, http://journalofvision.org/3/12/33/, doi:10.1167/3.12.33.

50. Brainard, D. H., Longere, P., Kraft, J.M., Delahunt, P.B., Freeman, W.T., and Xiao, B. (2004). Computational models of human color constancy, Proceedings of the Meeting on Computational & Systems Neuroscience, Cold Spring Harbor Laboratories, Cold Spring Harbor, NY, 3.

51. Hillis, J. M., & Brainard, D. H. (2004). Color detection and appearance: A non-linear link. Journal of Vision, 4, 57a, http://journalofvision.org/4/8/57/, doi:10.1167/4.8.57.

52. Ripamonti, C., Bloj, M., Greenwald, S., & Brainard, D. H. (2004). An equivalent illumiant model of how perceived lightness varies with scene geometry. Journal of Vision, 4, 120a, http://journalofvision.org/4/8/120/, doi:10.1167/4.8.120.

53. Ripamonti, C., Greenwald, S., Brainard, D. H. (2004). Lightness constancy and object pose: effect of articulation. European Conference on Visual Perception. http://www.perceptionweb.com/ecvp04/0367.html.

54. Brainard, D. H. (2004). The dual functions of color vision: connecting thresholds and appearance. Journal of Vision, 4, 25a, http://journalofvision.org/4/11/25/, doi:10.1167/4.11.25.

55. Hillis, J., & Brainard, D. (2004). A shadowy dissociation between discriminability and identity. Journal of Vision, 4, 56a, http://journalofvision.org/4/11/56/, doi:10.1167/4.11.56.

56. Prasad, S, Aguirre, G. K., Walker, J., Brainard, D. H., Chatterjee A. (2005). Area V5/MT demonstrates altered temporal responses in Riddoch syndrome. American Academy of Neurology, Miami Beach, FL.

57. Yin, L., Smith, R. G., Sterling, P., Brainard, D. H. (2005). Retinal processing of color information in guinea pig. ARVO Annual Meeting, Ft. Lauderdale, FL.

58. Aguirre, G. K., Komaromy, A. M., Brainard, D. H., Walker, J. M., Maguire, A. M., Bennett, J., Hauswirth, W. W., Acland, G. M., Aguirre, G. D. (2005). fMRI of recovered cortical visual responses following gene therapy in dogs. ARVO Annual Meeting, Ft. Lauderdale, FL.

59. Xiao, B., Kanyuk, P. J., & Brainard, D. H. (2005). Color appearance and the material properties of three-dimensional objects. Vision Sciences Society Annual Meeting, Sarasota, FL, 782a, http://journalofvision.org/5/8/782/, doi:10.1167/5.8.782.

60. Wilson, J. A., & Brainard, D. H. (2005). Perceptual evaluation of statistical image models. OSA Fall Vision Meeting, 93a, http://journalofvision.org/5/12/93/, doi:10.1167/5.12.93.

61. Radoeva, P. D., Brainard, D. H., & Aguirre, G. K. (2006). Contrast responses and retinotopic organization in Blindsight: an fMRI study. Vision Sciences Society Annual Meeting, Sarasota FL, 541a, http://journalofvision.org/6/6/541/, doi:10.1167/6.6.541.

62. Hillis, J. M., & Brainard, D. H. (2006). Lightness constancy in shadows: Evidence for high level inference. Vision Sciences Society Annual Meeting, Sarasota FL, 709a, http://journalofvision.org/6/6/709/, doi:10.1167/6.6.709.

63. Allred, S. R., & Brainard, D. H. (2007). Parametric measurements of lightness in the context of real illuminated objects. Vision Sciences Society Annual Meeting, Sarasota, FL, 234a, http://journalofvision.org/7/9/234/, doi:10.1167/7.9.234.

64. Maloney, L. T., Doerschner, K., & Brainard, D. H. (2007). Color constancy in 3D scenes: contrasting illumination-estimation and heuristic models. Vision Sciences Society Annual Meeting, Sarasota, FL, 458a, http://journalofvision.org/7/9/458/, doi:10.1167/7.9.458.

65. Brainard, D. H., Hofer, H., & Williams, D. R. (2007). Bayesian models of color appearance: Understanding the appearance of small spot colors. Vision Sciences Society Annual Meeting, Sarasota FL, 791a, http://journalofvision.org/7/9/791/, doi:10.1167/7.9.791.

66. Allred, S. R. & Brainard, D. H. (2007). Scene complexity affects lightness constancy with respect to changes in object slant and surround reflectance. OSA Fall Vision Meeting, Sept 16-19, Berkeley, CA, 51a, http://journalofvision.org/7/15/51/, doi:10.1167/7.15.51.

67. Xiao, B. & Brainard, D. H. (2007). Effect of test patch location on color appearance, in the context of 3D objects. 6th International Radiance and HDR Scientific Workshop, Twin Cities, Minnesota, October 1-2, 2007.

68. Lichtman, D. P., Xiao, B. & Brainard, D. H. (2007). RenderToolbox: A MATLAB Toolkit for Hyperspectral Rendering with Radiance and PBRT. 6th International Radiance and HDR Scientific Workshop, Twin Cities, Minnesota, October 1-2, 2007.

69. Allred, S. R., Lohnas, L. J., & Brainard, D. H. (2008). Bayesian model of the staircase Gelb effect. Vision Sciences Society Annual Meeting, Naples, FL, 283a, http://journalofvision.org/8/6/283/, doi:10.1167/8.6.283.

70. Allred, S. R., Lohnas, L. J., & Brainard, D. H. (2008). Bayesian model of lightness perception. Gordon Research Conference on Sensory Coding and the Natural Environment, Lucca, Italy, July 27-August 1, 2008.

71. Gingras, G., Komaromy, A., Brainard, D. H., Tseng, B., Acland, G. M., Aguirre, G. D., & Aguirre, G. K. (2008). Cortical responses to rod and cone-isolating flicker in a canine model of achromatopsia. Society for Advancement of Chicanos and Native Americans in Science, Salt Lake City, Utah, October 9-12, 2008.

72. Allred, S., Troiani, V., Lohnas, L., Jiang, L., Radonjic, A., Gilchrist, A. & Brainard D. (2009). An ideal observer model predicts lightness matches. Vision Sciences Society Annual Meeting, Naples, FL, May 8-13, 2009, 345a, http://journalofvision.org/9/8/345/, doi:10.1167/9.8.345.

73. Xiao B. & Brainard D. (2009). Surface material properties and color constancy of 3D objects. Vision Sciences Society Annual Meeting, Naples, FL, May 8-13, 2009, 359a, http://journalofvision.org/9/8/359/, doi:10.1167/9.8.359.

74. Gingras, G., Komaromy, A. M., Tseng, B., Alexander, J. J., Chiodo, V. V., Hauswirth, W. W., Acland, G. M., Aguirre, G. D., Brainard, D. H., & Aguirre, G. K. (2009). Cortical recovery following gene therapy in a canine model of achromatopsia. Vision Sciences Society Annual Meeting, Naples, FL, May 8-13, 2009, 311a, http://journalofvision.org/9/8/311/, doi:10.1167/9.8.311.

75. Das, S., Oliver, R., Avants, B., Radoeva, P., Brainard, D., Aguirre, G., Gee, J. (2009). A semi-automated solution for increasing the reliability of manually defined visual area boundaries. Vision Sciences Society Annual Meeting, Naples, FL, May 8-13, 2009, 771a, http://journalofvision.org/9/8/771/, doi:10.1167/9.8.771.

76. Das, S., Oliver, R., Avants, B., Radoeva, P., Brainard, D., Aguirre, G., Gee, J. (2009). Reliability of semi-automated visual area definitions in retinotopy. Organization for Human Brain Mapping Annual Meeting, San Francisco, CA, June 18-23, 2009, Neuroimage, 47, S1.

77. Oliver, R., MacIntyre, L., Doerschner, K., Maloney, L. T., Brainard, D. H. (2009). Interaction between stimulus depth and color appearance: in search of large effects. OSA Fall Vision Meeting, September 24-27, Seattle, WA.

78.Olkkonen, M. & Brainard, D. H. (2009). Perception of lightness and glossiness under natural light fields. OSA Fall Vision Meeting, September 24-27, Seattle, WA.

79. Lee, T. Y. & Brainard D. H. (2009). Spatial integration and lightness perception. OSA Fall Vision Meeting, September 24-27, Seattle, WA.

Theses Supervised

C. C. Chen (1996, co-chair). Chromatic pattern vision mechanisms: masking experiments and divisive inhibition models. Ph.D. Thesis. Department of Psychology, UC Santa Barbara.

W. A. Brunt (1996, chair). Simultaneous color constancy measured using asymmetric color matching under naturalistic conditions. Master Thesis. Department of Psychology, UC Santa Barbara.

J. M. Speigle (1998, chair). Testing whether a common representation explains the effect of viewing context on color appearance. Ph.D. Thesis, Department of Psychology, UC Santa Barbara.

P. B. Egan (1998, chair). The relationship between lightness and color appearance: are context effects calculated independently for each cone type? Master Thesis. Department of Psychology, UC Santa Barbara.

M. D. Rutherford (2000, chair). The role of illumination perception in color constancy. Ph.D. Thesis, Department of Psychology, UC Santa Barbara.

P. B. Delahunt (nee Egan) (2001, chair). An evaluation of color constancy across illumination and mutual reflection changes. Ph.D. Thesis, Department of Psychology, UC Santa Barbara

L. Yin (2008, co-chair). Retinal processing of achromatic and chromatic signals in guinea pig along the dual gradient in cone opsin expression. Ph.D. Thesis, Neuroscience Graduate Program, University of Pennsylvania.

B. Xiao (2009). Color perception and constancy of objects in 3D complex scenes. Ph.D. Thesis, Neuroscience Graduate Program, University of Pennsylvania.

Post-Doctoral Advisees

J. M. Kraft, 1996-1999.
M. P. Rowe, 2000-2001.
P. Longere, 2000-2001.
K. Ripamonti, 2002-2004.
J. M. Hillis, 2002-2005.
J. A. Wilson, 2004-2006.
S. R. Allred, 2006-present.
R. T. Oliver, 2007-present.
M. Olkkonen, 2009-present.

Graduate Rotation Supervision (Penn)

Lu Yin, Neuroscience, 2001
Bei Xiao, Neuroscience, 2003
Patrick Williams, Neuroscience, 2003
Guang Chen, Bioengineering, 2003
Jeremy Manning, Neuroscience, 2006
Lynn Lohnas, Neuroscience, 2007
Kristy Simmons, Neuroscience, 2007
Vanessa Troiani, Neuroscience, 2008
Jiang Li, Neuroscience, 2008

PhD Thesis Committees (Penn)

Crystal Lutz, Psychology, 2003
Jason Liu, Radiology, 2005
Hjiang Qi, Bioengineering, 2007
Patrick Connolly, Neuroscience, 2008
Joshua Jacobs, Neuroscience, 2008
Daniel Drucker, Psychology
Rishi Kalwani, Neuroscience
Xiang Cao, Bioengineering
Jeremy Manning, Neuroscience
Nina Hsu, Neuroscience

Undergraduate Research Supervision (Penn)

Kiran Mitra, 2002, Independent Study
Robin Hauck, 2002, Independent Study
Joel Gutierrez, 2003, Summer Intern

Scott Greenwald, 2003, Paid Research Assistant
Paul Kanyuk, 2003, Paid Research Assistant
Sarah Kearney, 2005, Senior Thesis
Michal Parness, 2005, Senior Thesis
Cara O'Boyle, 2005, Paid Research Assistant
Catherine Sharrar, 2006, Senior Thesis
Jennifer Klein, 2006, Senior Thesis
David Harwood, 2007, Summer Intern
Ah Rim Shin, 2008, Senior Thesis
Brendan Hurst, 2008, Summer Intern
Elizabeth Megas, 2009, Independent Study

Invited Talks

1991, UC Irvine, "Reconstruction of signals from short-wavelength cones."
1992, UC San Diego, "Reconstruction of signals from short-wavelength cones."
1993, University of Rochester, "Bayes estimator for reconstruction from samples."
1993, UCLA, "Bayes estimator for reconstruction from samples."
1993, Conference on Geometrical Representations of Mathematical Phenomena, "Reconstructing a trichromatic percept from univariate samples"
1993, UC Berkeley, "Ideal observer for reconstruction from trichromatic samples."
1993, Stanford University, "Ideal observer for reconstruction from trichromatic samples."
1993, UCSB, Department of Statistics, "Bayesian method for reconstruction from trichromatic samples: applications to human vision."
1994, Society for Illumination Engineering, Santa Barbara Chapter, "How the illumination affects color appearance."
1994, UCSB, Department of Physics, "Non-linear inverse problems: applications to color vision."
1994, UCSB, Department of Electrical and Computer Engineering, "Bayesian method for recovering surface and illuminant properties from photosensor responses."
1994, IS&T 47th Annual Meeting, "Bayesian method for reconstructing color images from trichromatic samples."
1994, Goldstar Corporation Image and Media Lab, Seoul, Korea, "Color constancy in human and machine vision."
1994, Osaka Electro-Commuication University, Osaka, Japan, "Color constancy in human and machine vision."
1995, UC Irvine, Department of Cognitive Science, "Color constancy in the nearly natural image."
1995, MIT, Department of Brain and Cognitive Sciences, "Color constancy in the nearly natural image."
1995, IBM Almaden Research Center, "Color constancy: perceptual computations in humans and computers."
1995, Keynote address, "Reconstructing images from trichromatic samples: from basic research to practical applications." IS&T Color Imaging Conference, Scottsdale, AZ.
1995, Trieste Encounters in Cognitive Science, Trieste, Italy. "Color constancy in the nearly natural image."
1996, Second NECI Vision Workshop, "Color constancy in the nearly natural image."
1996, FASEB Meeting on Retinal Neurobiology and Visual Performance, "Behavioral consequences of retinal sampling: interactions between space and color."
1996, University of California Workshop on Vision Modeling, "Bayesian modeling of human performance."
1996, UCLA, Department of Psychology, "Color constancy in the nearly natural image."

1997, Second Annual Hewlett-Packard Session on University Research in Imaging, "Hyperspectral color imaging."
1997, Optical Society of America Annual Meeting, Workshop on Visual Modeling Environments.
1997, Workshop on Natural Scene Statistics, Jimminy Peak, MA. "Chromatic structure in natural images."
1997, California Institute of Technology, CNS, "Color constancy in the nearly natural image."
1998, UC Berkeley, "Color constancy in the nearly natural image."
1998, Smith-Kettlewell Eye Research Institute, "Color constancy in the nearly natural image."
1998, University of Chicago, "Color constancy in the nearly natural image."
1998, University of Rochester, Center for Visual Science Symposium: Environmental Structure, Statistical Learning, and Visual Perception, "Color constancy in the nearly natural image."
1998, University of Oregon, "Color constancy in the nearly natural image."
1999, University of Washington, "Color constancy in the nearly natural image."
1999, SIGGRAPH, Panel Presentation, "How realistic are monitor images?
2000, University of Pennsylvania, " Color constancy in the nearly natural image."
2000, Keynote address: ISSC Panchromatic 2000 Conference, "Color constancy and color context effects."
2001, Smith-Kettlewell Eye Research Institute, Workshop, Bayes 2001, "Bayesian modeling of human color constancy."
2001, NYU, "Computational mechanisms of color constancy."
2002, Rutgers (New Brunswick), "Computational mechanisms of color constancy."
2003, Brown University, "Computational mechanisms of color constancy."
2003, Schepens Eye Research Institute, Broadhurst Distinguished Lecture Series, "Computational mechanisms of color constancy."
2003, Penn Institute of Neural Science Retreat, "Mechanisms of color constancy."
2003, University of Rochester, "That was then, this is now: 40 years of color vision."
2003, NYU, Workshop on Perception of Color and Material Properties in Three-Dimensional Scenes, "Lightness constancy: the effect of surface slant."
2003, Keynote address, IS&T Color Imaging Conference, Scottsdale, AZ,."Computational mechanisms of human color constancy",
2004, Rutgers (Newark), "Lightness constancy: the effect of surface slant."
2004, UT Austin, "Computational mechanisms of color constancy."
2005, Keynote address, 10th Congress of the International Colour Association, "Computational mechanisms of color constancy", May 8-13, Granada, Spain.
2006, Cambridge Research Systems invited lecture, Vision Meeting of the Colour Group of Great Britain, "Bayesian models of color appearance: understanding the appearance of small spot colors", January 12, London, England.
2006, Macbeth Award invited lecture, "Bayesian models of color appearance", Annual Meeting of the ISCC, May 14-15, 2006, Ottowa, Canada.
2006, Columbia University, "Color from a single cone? Understanding the appearance of small spot colors."
2007, Invited lecture, "Gloss, color, and 3D objects", 19th Symposium of the International Colour Vision Society, July 27-31, 2007, Belem, Brazil.
2007, New York University, "Color, Bayes, and the trichromatic mosaic: understanding the appearance of small spot colors."
2007, IMBS Conference on Mathematics and Vision,"Color, cones, and Bayesian modeling: understanding the appearance of small spot colors," UC Irvine, November 9-11, 2007, Irvine, CA.
2008, Workshop on Natural Environments, Tasks, and Intelligence, "Bayes and the trichromatic cone mosaic," UT Austin, March 28-30, 2008, Austin, TX.
2008, Workshop on Perception of Material Properties in 3D Scenes, "Material, color, and complex scenes," University of Pennsylvania, October 17-19, 2008, Philadelphia, PA.
2009, Workshop on Cognitive and Developmental Factors in Perceptual Constancy, Discussant, University of Pennsylvania, February 20-22, 2009, Philadelphia, PA.

2009, Visual Processing in Insects II, “Bayes, color, and the trichromatic cone mosaic,” Janelia Farm, May 17-20, 2009, Ashburn, VA.
2009, OSA Fall Vision Meeting, “Bayesian Models of Object Color Perception,” September 24-27, 2009, Seattle, WA.
2009, Rutgers University, “Color, Cones, and Bayesian Modeling: Understanding the Appearance of Small Spot Colors,” October 12, 2009, New Brunswick, NJ.

Reviewing

Applied Optics; Brain; Color Research and Application; Current Biology, Graphics Interface '94 Conference; IEEE Transactions on Image Processing; Journal of the Optical Society; Journal of Mathematical Psychology; Journal of Neuroscience; Journal of Vision; Nature; Nature Neurosciience; Neuron; NIPS; NSF; Optical Engineering; Perception; Perception and Psychophysics; Proceedings of the National Academy of Sciences USA; Psychological Science; Siggraph; Spatial Vision; Vision Research; Wellcome Trust

Teaching

Courses taught:
- Perception: Vision (undergraduate)
- Laboratory in Perception (undergraduate)
- Visual Neuroscience (undergraduate)
- Eye, Mind, and Image (undergraduate)
- Visual Systems Analysis (undergraduate/graduate)
- Mathematical Psychology (graduate)
- Perception (graduate)
- Advanced Visual Neuroscience (graduate)
- Assorted Graduate Seminars

1995, Invited Faculty, McDonnell Foundation Summer Institute in Cognitive Neuroscience.
1996, 1998, 2000, 2002, 2004, 2006, 2008, Invited Faculty, Cold Spring Harbor Lab Short Course in Computational Neurobiology: Vision.
1998, Society for Information Display Short Course in Color Science.
1998, Outside Member, Dissertation Committee of Elaine Jin, University of Chicago.
1998, Reader for Habilitation of Heinz Bauml, Unversity of Regensburg.
1998, Optical Socieity of America Annual Meeting, Short Course in Color Spaces.
1999, Outside Member, Dissertation Committee of Barnard Kobus, Simon Fraser University.
2001-2003, 2005, Lecturer, IRCS Summer Undergraduate Workshop in Cognitive Science.
2002, Outside Member, Dissertation Committee of Elizabeth Johnson, New York University.
2005, Outside Member, Dissertation Committee of Katja Doerschner, New York University.
2008, 2009, Co-organizer, IRCS Summer Undergraduate Workshop in Cognitive Science.
2008, Invited Faculty, Sage Center Summer Institute in Cognitive Neuroscience.
2007-2009, Lecturer, Penn Summer Undergraduate Program in Computational Neuroscience.
2008, Outside Member, Dissertation Committee of Ana Radonjic, Rutgers University.
2009, Lecturer, Penn Biomedical Graduate Studies Summer Undergraduate Internship Program.

Professional Service

1991, Technical Committee, OSA Annual Meeting.
1995, Technical Committee, OSA Annual Meeting.
1996, Temporary Member, NIH Vision Sciences B Study Section (twice)
1997-2003, Topical Editor for Color, Journal of the Optical Society A.

2000-2002, NIH Visual Sciences B Study Section.
2001-2003, OSA Tillyer Award Committee.
2001-2007, Vision Sciences Society Abstract Review Board
2003, Chair, NIH Special Emphasis Study Section (July)
2003-present, Board of Editors, Journal of Vision.
2003, Organizer (with L. T. Maloney), Workshop on Perception of Color and Material Properties in Three-Dimensional Scenes, New York University, October 2003.
2004, NIH Special Emphasis Study Section (March)
2004, Chair, NIH Special Emphasis Study Section (July)
2005, Chair, NIH Special Emphasis Study Section (March)
2006, NIH Special Emphasis Study Section (June)
2006, NIH Special Emphasis Study Section (November)
2007, Program Committee, SIGGRAPH Meeting on Applied Perception and Computer Graphics
2008, Session Chair and Discussant, Gordon Research Conference on Sensory Coding and the Natural Environment, Lucca, Italy.
2008, Organizer (with L. T. Maloney, A. Hurlbert), Workshop on Perception of Material Properties in 3D Scenes, University of Pennsylvania, October 2008.
2008, Chair, NIH Special Emphasis Study Section (December)
2009-present, Vice-Chair for Color Group, OSA Vision and Color Division.

Departmental and University Service (UCSB)

1991-97, Life Sciences Computing Facility Steering Committee.
1991-92, Department Computer Committee.
1992-93, Department Graduate Admissions Committee.
1992-93, Department Mathematics/Statistics Curriculum Committee.
1992-94, College Computing Task Force.
1992-97, Organizer of Vision Science Seminar Series.
1993, 1996, 1997, Faculty Participant, Freshman Orientation Program.
1993, Ad-hoc group to meet with UC Provost Walter Massey.
1993-94, Department Executive Committee.
1993-94, Department Mathematics/Statistics Curriculum Committee (Chair).
1994-98, Department Technical Policy Committee (Chair, 95-98).
1995, University Small Department Graduate Fellowship Committee.
1996-97, College Computer Coordinator Search Committee.
1996-98, University Faculty Welfare Committee.
1996-98, University Child Care Advisory Committee (Co-Chair, 1997-98).
1997-98, Vision Science Search Committee (Chair).
1998-99, On sabbatical leave.
1999-00, Vision Science Search Committee (Chair).
1999-00, Life Sciences Computing Facility Steering Committee.
1999-01, Department Technical Policy Committee (Chair, 2000-01).
2000-01, University Committee on Capital Projects.
2000-01, Neuroscience Research Institute Advisory Board
2000-01, Psychology Department Executive Committee.

Department and University Service (Penn)

2001-03, Chair's Advisory Group, Department of Psychology.
2002-04, Psychology Department Space Committee
2001-05, Committee on Visual Studies Major.
2002-05, Executive Committee, Penn's NIH Vision Training Grant.

2002-03, Chair, Perception Search Committee.
2002-03, Departmental Ad-Hoc Faculty Reappointment Committee.
2002-03, Departmental Ad-Hoc Tenure Review Committee.
2002-05, Neuroscience Graduate Admissions Committee.
2003-04, Departmental Ad-Hoc Target of Opportunity Hiring Committee.
2003-05, Chair, Departmental Web Site Committee
2003-04, SAS Personnel Committee.
2004-05, Chair, SAS Personnel Committee.
2004-05, Chair, Departmental Ad-Hoc Faculty Reappointment Committee.
2005-06, Center for Cognitive Neuroscience Steering Committee.
2005-Present, Chair, Department of Psychology
2006, SAS Task Force on Structure of Personnel Committee.
2006-2007 Provost's Neuroscience Cluster Working Group.
2006-Present, Institute for Research in Cognitive Science Executive Committee.
2007, SAS Committee on Metrics.
2009-Present, Director, Penn Vision Research Center (Co-Director, 2005-2008).

Consulting

1994-1997, Hewlett-Packard Laboratories.
1998-99, Enroute, Inc.

Media Appearances

Guest on NPR's Please Explain: Emotion and Color, The Leonard Lopate Show, February 20, 2009. See http://www.wnyc.org/shows/lopate/episodes/2009/02/20/segments/124355.

Film Appearances

Played part of Samual Allison. *Fat Man and Little Boy* (1989. Paramount Pictures. Directed by R. Joffe. Starring P. Newman, J. Cusak).