

# John Palmer

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## Education

B. S. in Psychology, 1976, University of Washington, Seattle WA

Ph. D. in Psychology, 1984, University of Michigan, Ann Arbor, MI

## Professional History

1973 - 1979	Research Technician, University of Washington
1979 - 1984	Graduate Training, University of Michigan
1984 - 1988	Assistant Professor, University of Washington
1988 - 1989	Visiting Assistant Professor, Stanford University
1989 - 1992	Assistant Professor, University of Washington
1992 - 2005	Research Consultant, University of Washington
2005 - present	Research Professor, University of Washington

## Research and Teaching Interests

Cognitive Psychology, especially Attention  
Visual Perception, Visual Psychophysics and Visual Neuroscience

My research focuses on visual attention. Much of the work involves the quantitative measurement of selective and divided attention phenomena using the methods of visual psychophysics. These measurements are used to test alternative quantitative theories. I also have an ongoing collaborations with Dr. Cathleen Moore on visual attention and with Dr. Geoff Boynton on the neural basis of attention.

## Books

Teller, D. Y. and Palmer, J. (expected 2022). Linking Vision and the Visual System, Oxford: Oxford University Press.

Dr. Teller completed 90% of this book before she passed away. I am finishing it and the nearly final version can be found at my web site:  
<http://faculty.washington.edu/jpalmer/files/Teller/>

## Publications

Loftus, E., & Palmer, J. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. Journal of Verbal Learning and Verbal Behavior, 13, 585-589.

Burkhardt, K., Palmer, J., & Waddington, W. (1976). An intelligent experimental station controller. Behavior Research Methods & Instrumentation, 8, 369-374.

Palmer, J., MacLeod, C., & Loftus, G. (1978). PLE: A high-level multiprogramming language for psychology. Behavior Research Methods & Instrumentation, 10, 764-772.

Palmer, J., MacLeod, C., Hunt, E., & Davidson, J. (1985). Information processing correlates of reading. Journal of Memory and Language, 24, 59-88.

Jonides, J., Naveh-Benjamin, M., & Palmer, J. (1985). Assessing automaticity. Acta Psychologica, 60, 157-171.

MacLeod, C. M., Jackson, R. A., & Palmer, J. (1986). On the relation between spatial ability and field dependence. Intelligence, 10, 141-151.

Palmer, J. (1986). Mechanisms of displacement discrimination with and without perceived movement. Journal of Experimental Psychology: Human Perception and Performance, 12, 411-421.

Palmer, J. (1986). Mechanisms of displacement discrimination with a visual reference. Vision Research, 12, 1939-1947.

Palmer, J., & Jonides, J. (1988). Automatic memory search and the effects of information load and irrelevant information. Journal of Experimental Psychology: Learning, Memory, and Cognition, 14, 136-144.

Palmer, J. (1988). Very short-term memory for size and shape. Perception & Psychophysics, 43, 278-286.

- Palmer, J. (1990). Attentional limits on the perception and memory of visual information. Journal of Experimental Psychology: Human Perception and Performance, 16, 332-350.
- Palmer, J. (1991). Isolating the components of very short-term visual memory, Bulletin of the Psychonomic Society, 29, 399-402.
- Ankrum, C. & Palmer, J. (1991). Memory for objects and parts. Perception & Psychophysics, 50, 141-156.
- Palmer, J. & Ames, C. T. (1992). Measuring the effect of multiple eye fixations on memory for visual attributes, Perception & Psychophysics, 52, 295-306.
- Palmer, J., Ames, C. T., & Lindsey, D. T. (1993). Measuring the effect of attention on simple visual search. Journal of Experimental Psychology: Human Perception and Performance, 19, 108-130.
- Palmer, J., Mobley, L. A., & Teller, D. Y. (1993). Motion at Isoluminance: Discrimination/detection ratios and the summation of luminance and chromatic signals. Journal of the Optical Society of America A, 10, 1353-1362.
- Palmer, J. (1994). Set-size effects in visual search: The effect of attention is independent of the stimulus for simple tasks. Vision Research, 34, 1703-1721.
- Kanungo, T., Jaisimha, M. Y., Palmer, J., & Haralick, R. M. (1995). A methodology for quantitative performance evaluation of detection algorithms. IEEE Transactions on Image Processing, 4, 1667-1674.
- Palmer, J. (1995). Attention in visual search: Distinguishing four causes of set-size effects. Current Directions in Psychological Science, 4, 118-123.
- Teller, D. Y. & Palmer, J. (1996). Infant color vision: Motion nulls for red/green vs. luminance-modulated stimuli in infants and adults. Vision Research, 36, 955-974.
- Teller, D. Y., Brooks, T. E. W. & Palmer, J. (1997). Infant color vision: Moving tritan stimuli do not elicit directionally appropriate eye movements in 2- and 4-month-olds. Vision Research, 37, 899-911.
- Palmer, J. (1998) Attentional effects in visual search: Relating search accuracy and search time. In R. Wright (Ed.), Visual Attention. New York: Oxford University Press.

- Lia, B., Dobkins, K. R., Palmer, J. & Teller, D. Y. (1999). Infants code the direction of chromatic quadrature motion. Vision Research, 39, 1783-1794.
- Chien, S. H. L., Teller, D. Y. & Palmer, J. (2000). The transition from scotopic to photopic vision in 3-month-old infants and adults: An evaluation of the rod dominance hypothesis. Vision Research, 40, 3853-3871.
- Eckstein, M. P., Thomas, J. P., Palmer, J., & Shimozaki, S. S. (2000). A signal detection model predicts the effects of set-size on visual search accuracy for feature, conjunction and disjunction displays. Perception & Psychophysics, 62, 425-451.
- Palmer, J., Verghese, P., & Pavel, M. (2000). The psychophysics of visual search. Vision Research, 40, 1227-1268.
- Rasengane, T. A., Palmer, J. & Teller, D. Y. (2001). Infant light adaptation shows Weber's law at photopic illuminances. Vision Research, 41, 359-373.
- Pereverzeva, M., Chien, S. H. L., Palmer, J. & Teller, D. Y. (2002). Infant photometry: are mean adult isoluminance values a sufficient approximation to individual infant values. Vision Research, 42, 1639-1649.
- Cornealissen, F. W., Peters, E. M., & Palmer, J. (2002). The eyelink toolbox: Eye tracking with MATLAB and the Psychophysics Toolbox. Behavior Research Methods, Instruments, & Computers, 34, 613-617.
- Chien, S. H. L., Palmer, J. & Teller, D. Y. (2003). Infant Lightness Perception: Do 4-month-old infants follow Wallach's ratio rule? Psychological Science, 14, 291- 295.
- Civan, A., Teller, D. Y. & Palmer, J. (2004). Relations between spontaneous preferences, familiarized preferences, and novelty effects: Measurements with forced-choice techniques. Infancy, 7, 111-142.
- Davis, E. T. & Palmer, J. (2004). Visual search and attention: An overview. Spatial Vision, 17, 249-256.
- Chien, S. H. L., Palmer, J. & Teller, D. Y. (2005). Achromatic contrast effects in infants: Adults and 4-month-old infants show similar deviations from Wallach's ratio rule. Vision Research, 45, 2854-2861.
- Palmer, J., Huk, A. C. & Shadlen, M. N. (2005). The effect of stimulus strength on the speed and accuracy of a perceptual decision. Journal of Vision, 5, 376-404, <http://journalofvision.org/5/5/1/>, doi:10.1167/5.5.1.

- Chien, S. H. L., Bronson-Castain, K., Palmer, J. & Teller, D. Y. (2006). Lightness constancy in 4-month infants. Vision Research, 46, 2139-2148.
- Busey, T. & Palmer, J. (2008). Set-size effects for identification versus localization depend on the visual search task. Journal of Experimental Psychology: Human Perception and Performance, 34, 790-810.
- Palmer, J. & Moore, C. M. (2009). Using a filtering task to measure the spatial extent of selective attention. Vision Research, 49, 1045-1064.
- Scharff, A., Palmer, J. & Moore, C. M. (2011). Extending the simultaneous-sequential paradigm to measure perceptual capacity for features and words. Journal of Experimental Psychology: Human Perception and Performance, 37, 813-833.
- Yigit-Elliott, S., Palmer, J. & Moore, C. M. (2011). Distinguishing blocking from attenuation in visual selective attention. Psychological Science, 22, 771-780.
- Scharff, A., Palmer, J. & Moore, C. M. (2011). Evidence of fixed capacity in visual object categorization. Psychological Bulletin and Review, 18, 713-721.
- Ernst, Z. R., Palmer, J. & Boynton, G. M. (2012). Dividing attention between two transparent motion surfaces results in a failure of selective attention. Journal of Vision, 12, 1-17.
- Scharff, A., Palmer, J. & Moore, C. M. (2013). Divided attention limits perception of 3-D object shapes. Journal of Vision, 13, 1-24.
- Attarha, M., Moore, C. M., Scharff, A. & Palmer, J. (2014). Evidence of unlimited-capacity surface completion. Journal of Experimental Psychology: Human Perception and Performance, 40, 556-565.
- Palmer, J., Boston, B. & Moore, C. M. (2015). Limited capacity for memory tasks with multiple features within a single object. Attention, Perception & Psychophysics, 77, 1488-1499.
- White, A. L., Runeson, E., Palmer, J., Ernst, Z. R. & Boynton, G. M. (2017). Evidence for unlimited capacity processing of simple features in visual cortex. Journal of Vision, 17, 1-20.
- White, A. L., Palmer, J. & Boynton, G. M. (2018). Evidence of serial processing in visual word recognition. Psychological Science, 29, 1062-1071.
- White, A. L., Palmer, J., Boynton, G. M. & Yeatman, J. D. (2019). Parallel spatial channels converge at a bottleneck in anterior word-selective cortex. Proceedings of the National Academy of Sciences, 116, 10087-10096.

White, A. L., Palmer, J. & Boynton, G. M. (2019). Visual word recognition: Evidence for a serial bottleneck in lexical access. Attention, Perception & Psychophysics, in press.

### **Proceedings, Technical Reports, Dissertation**

Palmer, J. (1985). Multiple mechanisms of visual localization: Evidence from movement and memory phenomena, (Doctoral dissertation, University of Michigan, Ann Arbor, 1984). Dissertation Abstracts International, 4507, Series B, 2344, (University Microfilms No. 84-22307).

Kanungo, T., Jaisimha, M. Y., Haralick, R. M. & Palmer, J. (1990). An experimental methodology for performance characterization of a line detection algorithm. SPIE Proceedings: Optics, Illumination, and Image Sensing for Machine Vision V, 1385, 104-112.

Kanungo, T., Jaisimha, M. Y., Palmer, J., & Haralick, R. M. (1993). A quantitative methodology for analyzing the performance of detection algorithms. Proceedings of the Fourth International Conference on Computer Vision ICCV93, pp. 247-252, Los Alamitos, CA: IEEE Computer Society Press.

Palmer, J. & Kantowitz, B. (1994). Daytime running lights and turn signal masking. Springfield, VA: National Technical Information Service (Report No. DOT HS 808 221).

### **Articles Reprinted in Books**

Loftus, E., & Palmer, J. (1982). Reconstruction of automobile destruction: An example of the interaction between language and memory. In U. Neisser (Ed.), Memory Observed: Remembering in Natural Contexts, (pp. 109-115). San Francisco: Freeman (original article published in 1974).

Jonides, J., Naveh-Benjamin, M., & Palmer, J. (1992). Assessing automaticity. In G. Underwood (Ed.), Attention. Cheltenham, Glos: Elgar (original article published in 1985).

Loftus, E., & Palmer, J. (1993). Reconstruction of automobile destruction: An example of the interaction between language and memory. In Peter E. Morris and M. Conway (Eds.), The International Library of Critical Writings in Psychology: Memory. New York: Academic Press (original article published in 1974).

## Special Issues and Conference Symposia

- Palmer, J. (1994). Vision-based models of attention and perception. Invited symposium organized for the meeting of the Society of Mathematical Psychology, Seattle, WA.
- Palmer, J. & Gorea, A. (2003). Attention and Decision Processes in Visual Perception. Invited symposium organized for the meeting of the European Conference on Visual Perception, Paris, France.
- Davis, E. T. & Palmer, J. (2004). Edited a special Issue on Visual Search and Attention. Spatial Vision, 17.

## Conference Presentations (\* transcripts available)

- Palmer, J., Jonides, J., & Palmer, C. (1980). Lack of voluntary control as a criterion for automatic processing. Talk presented at the Psychonomic Society Meeting, St. Louis, MO.\*
- Palmer, J. (1982). Elemental representations in visual form perception. Poster presented at the American Psychological Association Meeting, Washington, DC.
- Palmer, J. (1982). A new model of multiattribute stimulus comparison. Talk presented at the Mathematical Psychology Meeting, Princeton, NJ.\*
- Palmer, J. (1983). Context effects in dimensional models of stimulus comparison. Talk presented at the Mathematical Psychology Meeting, Boulder, CO.\*
- Palmer, J. (1984). Mechanisms for perceiving visual position and movement. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.
- Palmer, J. (1984). Differences between perceiving visual movement and perceiving visual position. Talk presented at the Psychonomic Society Meeting, San Antonio, TX.
- Palmer, J. (1985). Modeling context effects on displacement discrimination. Poster presented at the Association for Research in Vision and Ophthalmology, Sarasota, FL.
- Palmer, J., & Murakami, N. (1987). Are there always eccentricity effects in large-scale localization? Talk presented at the meeting of the Optical Society of America, Rochester, NY.\*

- Palmer, J., & Murakami, N. (1988). Weber's law for separation is not due to eccentricity. Talk presented at the meeting of the Optical Society of America, Santa Clara, CA.\*
- Palmer, J., & Ames, C. T. (1988). Visual memory from eye fixation to eye fixation. Talk presented at the meeting of the Psychonomic Society, Chicago, IL.\*
- Palmer, J., & Ames, C. T. (1989). Measuring the effect of multiple eye fixations on size and shape discrimination. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.
- Palmer, J. (1989). A multiplicative attenuation model of selective attention. Talk presented at the meeting of the Society of Mathematical Psychology, Irvine, CA.\*
- Ankrum, C. & Palmer, J. (1989). The perception and memory of objects and their parts. Talk presented at the meeting of the Psychonomic Society, Atlanta, GA.
- Palmer, J., Ames, C. T., & Lindsey, D. T. (1990). Does attention or decision limit visual search? Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.
- Palmer, J., Ames, C. T., & Lindsey, D. T. (1990). Are nonattentional processes the limit on visual search performance. Talk presented at the meeting of the Society of Mathematical Psychology, Toronto, ON, Canada.
- Palmer, J., Ames, C. T., & Lindsey, D. T. (1990). A visual search task in which decision is the only limit on performance. Poster presented at the meeting of the Optical Society of America, Boston, MA.\*
- Ankrum, C. & Palmer, J. (1990). Perception and memory of objects and parts. Talk presented at the meeting of the Optical Society of America, Boston, MA.
- Kanungo, T, Jaisimha, M. Y., Haralick, R. M. & Palmer, J. (1990). An experimental methodology for performance characterization of a line detection algorithm. Talk presented at SPIE, Robotics and Computer Vision IX, Boston, MA.
- Palmer, J., Ames, C. T., & Lindsey, D. T. (1990). Do nonattentional processes limit visual search performance. Talk presented at the meeting of the Psychonomic Society, New Orleans, LA.



- Palmer, J., Ames, C. T., & Aiken, D. E. (1991). Attentional effects on performance in visual tasks. Talk presented at the meeting of the Society of Mathematical Psychology, Bloomington, IN.\*
- Ankrum, C. & Palmer, J. (1991). Effect of cueing on object and part comparisons. Talk presented at the meeting of the Optical Society of America, San Jose, CA.\*
- Traynor, C. & Palmer, J. (1991). Bisection acuity as a function of stimulus energy. Talk presented at the meeting of the Optical Society of America, San Jose, CA.
- Palmer, J. & Ames, C. T. (1991). Why is there a set-size effect in visual search? Talk presented at the meeting of the Optical Society of America, San Jose, CA.
- Kantowitz, B. H., Elvers, G. C., & Palmer, J. (1991). Using attention operating characteristics to calibrate inferences about performance operating characteristics? Talk presented at the meeting of the Psychonomic Society, San Francisco, CA.\*
- Palmer, J. & Ames, C. T. (1991). Why is there a set-size effect in visual search? Talk presented at the meeting of the Psychonomic Society, San Francisco, CA.
- Palmer, J. & Ames, C. T. (1992). Isolating attentional and sensory contributions to visual search performance. Poster presented at the meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.\*
- Teller, D. Y., Mobley, L., & Palmer, J. (1992). Summation of luminance and chromatic signals for detection and direction-of-motion judgments. Poster presented at the meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.\*
- Palmer, J. (1992). What defines attentional phenomena? Talk presented at the meeting of the Society of Mathematical Psychology, Stanford, CA.\*
- Palmer, J. & Teller, D. Y. (1992). Color codes in visual search. Talk presented at the meeting of the Optical Society of America, Albuquerque, NM.
- Kanungo, T., Jaisimha, M. Y., Palmer, J. & Haralick, R. M. (1992). A methodology for analyzing the performance of detection tasks. Talk presented at the meeting of the Optical Society of America, Albuquerque, NM.

- Ankrum, C., and Palmer, J. (1992). The whole advantage in object and part comparisons. Poster presented at the meeting of the Psychonomic Society, St. Louis, MO.
- Palmer, J., and Anderson, B. (1992). Dividing attention among multiple attributes of a single object. Talk presented at the meeting of the Psychonomic Society, St. Louis, MO.
- Palmer, J. (1993). The effect of attention is independent of the stimulus in simple visual search. Talk presented at the Western Attention Meeting, Eugene, OR.
- Kanungo, T., Jaisimha, M. Y., Palmer, J., & Haralick, R. M. (1993). A quantitative methodology for analyzing the performance of detection algorithms. Poster presented at the Fourth International Conference on Computer Vision ICCV93, Berlin, Germany.
- Palmer, J. & Teller, D. Y. (1993). Color codes in visual search: The effects of target and distractor heterogeneity on search accuracy thresholds. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.\*
- Palmer, J. (1994). Visual search latency: The influence of target-distractor discriminability on the magnitude of set-size effects. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.\*
- Palmer, J. (1994). Converging measures of the effect of attention on visual search. Poster presented at the Eriksen Conference, University of Illinois, Urbana-Champaign, IL.\*
- Palmer, J. (1994). The psychophysics of attention and visual search. Invited address presented at the Fechner Day meeting of the International Society for Psychophysics, Vancouver, Canada.
- Palmer, J. (1994). Is there a common mechanism for attentional effects on search accuracy and search time? Talk presented at the meeting of the Society of Mathematical Psychology, Seattle, WA.
- Palmer, J. (1994). Is there a common mechanism for attentional effects on search accuracy and search time? Talk presented at the meeting of the Psychonomic Society, St. Louis, MO.
- Palmer, J. (1995) Attentional effects in visual search: Relating search accuracy and search time. Invited address at the cognitive science meeting on attention, Simon Fraser University, Vancouver, Canada.

- Palmer, J. & Teller, D. Y. (1995). Equivalent luminance contrasts in infants and adults. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.\*
- Palmer, J. (1995). Set-size effects in visual search: Is there a common mechanism for accuracy and time? Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Palmer, J. & McLean, J. (1995). Imperfect, independent, parallel search yields large set-size effects. Talk presented at the meeting of the Society of Mathematical Psychology, Irvine, CA.\*
- Palmer, J. & McLean, J. (1995). Large set-size effects in search do not reject independent, parallel models. Talk presented at the meeting of the Psychonomic Society, Los Angeles, CA.
- Palmer, J. & McLean, J. (1996). Visual Search: Large set-size effects do not reject models based upon independent channels. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Traynor, C. D., Palmer, J. & Buck, S. L. (1996). Light adaptation results in illusory contrast reversals for temporally modulated stimuli. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Eckstein, M. P., Thomas, J. P., Palmer, J. & Shimozaki, S. S. (1996). Further predictions of signal detection theory on visual search accuracy: Conjunctions, disjunctions and triple conjunctions. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Palmer, J. & McLean, J. (1996). Visual Search: Large Set-Size Effects Do Not Reject Models Based Upon Unlimited-Capacity, Parallel Processing. Invited talk presented at the Western Attention Meeting, Pomona, CA.
- McLean, J. E., Palmer, J. & Loftus, G. R. (1996). Evidence for unlimited capacity in letter perception and memory. Talk presented at the meeting of the Psychonomic Society, Chicago, IL.
- Teller, D. Y., Lia, B., Dobkins, K. R., Hartzler, A., & Palmer, J. (1997). 3-month-old infants respond to color-defined quadrature-shifted apparent motion stimuli. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.

- Rasengane, T. A., Teller, D. Y., & Palmer, J. (1997). The effect of retinal illuminance on contrast thresholds in human infants. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- McLean, J. E., Palmer, J. & Loftus, G. R. (1997). Comparison of set-size effects in visual search and memory. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Palmer, J., Pavel, M., & Verghese, P. (1997). Visual search: On the generality of predictions based upon signal detection theory. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Lia, B., Dobkins, K. R., Hartzler, A., Palmer, J., & Teller, D. Y. (1997). 3-month-old infants respond to quadrature motion of isoluminant gratings. Talk presented at the meeting of the Child Vision Research Society, Pisa, Italy.
- Palmer, J., Pavel, M., & Verghese, P. (1997). Theories of Visual Search: Comparing Alternatives based upon High Threshold and Signal Detection Theory. Talk presented at the meeting of the Society of Mathematical Psychology, Bloomington, IN.
- Palmer, J., Pavel, M., & Verghese, P. (1997). Is Visual Search Consistent with High Threshold or Signal Detection Theory? Talk presented at the meeting of the Psychonomic Society, Philadelphia, PA.
- McLean, J. E., Palmer, J. & Loftus, G. R. (1997). Comparison of set-size effects in visual search and memory. Talk presented at the meeting of the Psychonomic Society, Philadelphia, PA.
- Palmer, J., Verghese, P. & Pavel, M. (1998). What domain is appropriate for testing simple theories of visual search? Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Rasengane, T. A., Teller, D. Y., & Palmer, J. (1998). The effect of retinal illuminance on chromatic contrast thresholds in human infants. Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Chien, H., Teller, D. Y., & Palmer, J. (1999). "Rod dominance" in infants?: Motion photometric measurements of the transition from scotopic to photopic vision in infants vs. adults. Poster presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.

- Palmer, J., McLean, J. E. & Loftus, G. R. (1999). Divided attention in perception and memory. Poster presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- McLean, J. E., Palmer, J. & Loftus, G. R. (1999). Divided attention in perception and memory of simple visual features. Talk presented at the meeting of the Psychonomic Society, Los Angeles, CA.
- Teller, D. Y., Pereverzeva, M., Chien, S. H. L. & Palmer, J. (2000). Are adult and infant isoluminance points the same? Poster presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Chien, S. H. L., Allred, S., Teller, D. Y. & Palmer, J. (2000). Young infants' perception of surface lightness. Talk presented at the meeting of the Optical Society of America, Providence, RI.
- Gold, J. I., Mihali, M. L., Palmer, J. & Shadlen, M. N. (2000). Psychophysical correlates of temporal integration in sensory-motor decisions. Poster presented at the meeting of the Society for Neuroscience, New Orleans, LA.
- Mazurek, M. E., Roitman, J. D., Palmer, J. & Shadlen, M. N. (2000). Temporal integration as a mechanism for sensory-motor decisions. Poster presented at the meeting of the Society for Neuroscience, New Orleans, LA.
- Palmer, J. (2001). How does divided attention in perception depend on the stimulus? Talk presented at the meeting of the Optical Society of America, Irvine, CA.
- Chien, S. H. L., Teller, D. Y. & Palmer, J. (2001). Simultaneous lightness contrast in 4-month-olds: Do infants use Wallach's ratio rule? Talk presented at the meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL.
- Mazurek, M. E., Ditterich, J., Palmer, J. & Shadlen, M. N. (2001). Effect of prior probability on behavior and LIP responses in a motion discrimination task. Poster presented at the meeting of the Society for Neuroscience, San Diego, CA.
- Ditterich, J., Mazurek, M. E., Roitman, J. D., Palmer, J. & Shadlen, M. N. (2001). A computational model of the speed and accuracy of motion discrimination. Poster presented at the meeting of the Society for Neuroscience, San Diego, CA.

- Busey, T. & Palmer, J. (2001). Set-Size Effects in Identification and Localization: Theory and Data. Talk presented at the meeting of the Psychonomic Society, Orlando FL.
- Huk, A., Palmer, J. & Shadlen, M. N. (2002). Temporal integration of visual motion information: Evidence from response times. Talk presented at the meeting of the Visual Sciences Society, Sarasota, FL.
- Busey, T. & Palmer, J. (2002). For visual search, the details of the task reverse the ordering of the set-size effect for localization and identification. Talk presented at the meeting of the Society for Mathematical Psychology, Oxford, OH.
- Huk, A., Palmer, J. & Shadlen, M. N. (2002). Temporal integration of motion energy underlies perceptual decisions and response times. Poster presented at the meeting of the Society for Neuroscience, Orlando, FL.
- Civan, A. L., Teller, D. Y. & Palmer, J. (2003). Infant color vision: Spontaneous preferences versus novelty preference as indicators of chromatic discrimination among suprathreshold stimuli. Talk presented at the meeting of the Visual Sciences Society, Sarasota, FL.
- Palmer, J. & Shadlen, M. N. (2003). A common analysis of spatial attention and response bias. Talk presented at the meeting of the European Conference on Visual Perception, Paris, France.
- Huk, A., Palmer, J. & Shadlen, M. N. (2003). A psychometric function for response time and accuracy. Talk presented at the meeting of the Psychonomic Society, Vancouver BC.
- Palmer, J. & Shadlen, M. N. (2005). A common analysis of spatial attention and response bias. Talk presented at the meeting of the International Conference on Attentional Control, National Chung-Cheng University, Chia-Yi, Taiwan.
- Palmer, J., McKinley, M., K., Mazurek, M., Shadlen, M. N. (2005). Effect of prior probability on choice and response time in a motion discrimination task. Talk presented at the meeting of the Visual Sciences Society, Sarasota, FL.
- Palmer, J., McKinley, M. K., Yang, T., Hanks, T. D., Mazurek, M. & Shadlen, M. N. (2005). Effect of prior probability on choice and response time in a motion discrimination task. Talk presented at the meeting of the Society for Mathematical Psychology, Memphis, TN.

- Zemach, I. K., Teller, D. Y. & Palmer, J. (2005). Substantial shifts of lightness matches can result from shifts of stimulus range. Talk presented at the Fall Vision Meeting, Tucson AZ.
- Churchland, A. K., Tam, M., Palmer, J., Kiani, R. & Shadlen, M. N. (2005). Responses of LIP neurons reflect accumulation of evidence in a multiple choice decision task. Talk presented at the meeting of the Society for Neuroscience, Washington, DC.
- Yang, T., Hanks, T., Mazurek, M., McKinley, M., Palmer, J. & Shadlen, M. N. (2005). Incorporating prior probability into decision-making in the face of uncertain reliability of evidence. Talk presented at the meeting of the Society for Neuroscience, Washington, DC.
- Palmer, J., McKinley, M. K. & Shadlen, M. N. (2005). Alternative accounts of the effect of prior probability on response time. Talk presented at the meeting of the Psychonomic Society, Toronto, ON.
- Zemach, I. K. & Palmer, J. (2006). Brief contrast adaptation affects lightness. Paper presented at the Fall Vision Meeting, Rochester, NY.
- Shadlen, M. N., Hanks, T. D., Mazurek, M. E., Kiani, R., Yang, T., Churchland, A. K., McKinley, M. K. & Palmer, J. (2006). The brain uses elapsed time to convert spike rate to probability. Talk presented at the meeting of the Society for Neuroscience, Atlanta, GA.
- Palmer, J. & Moore, C. M. (2007). Using foils to measure spatial tuning functions for visual attention. Poster presented at the meeting of the Visual Sciences Society, Sarasota, FL.
- Palmer, J. & Moore, C. M. (2007). Using foils to measure spatial tuning functions for visual attention. Talk presented at the meeting of the Psychonomic Society, Long Beach, CA.
- Yiğit, S., Palmer, J. & Moore, C. M. (2008). Partially valid cueing and spatial filtering reveal different kinds of selection. Poster presented at the meeting of the Visual Sciences Society, Naples, FL.
- Scharff, A. & Palmer, J. (2008). Distinguishing serial and parallel models using variations of the simultaneous-sequential paradigm. Poster presented at the meeting of the Visual Sciences Society, Naples, FL.
- Hein, E., Moore, C. M., & Palmer, J. (2008). Perceptual structure facilitates spatial filtering. Poster presented at the meeting of the Visual Sciences Society, Naples, FL.

- Scharff, A. & Palmer, J. (2008). Distinguishing parallel and serial models using variations of the simultaneous-sequential paradigm. Talk presented at the meeting of the Psychonomics Society, Chicago, IL.
- Yiğit, S., Moore, C. M., & Palmer, J. (2008). Spatial Filtering and Partially Valid Cueing Reveal Different Kinds of Selection. Talk presented at the meeting of the Psychonomics Society, Chicago, IL.
- Palmer, J., Nguyen, V. D. & Moore, C. M. (2010). Selective attention to transparent motion is by blocking and not by attenuation. Talk presented at the meeting of the Visual Sciences Society, Naples, FL.
- Scharff, A., Palmer, J. & Moore, C. M. (2010). Is object recognition serial or parallel? Talk presented at the meeting of the Visual Sciences Society, Naples, FL.
- Scharff, A., Palmer, J. & Moore, C. M. (2010). Object perception under divided attention: Fixed-capacity categorization of natural objects. Talk presented at the meeting of the Psychonomics Society, St. Louis, MO.
- Scharff, A., Palmer, J. & Moore, C. M. (2011). Object shape identification has fixed capacity under divided attention. Talk presented at the meeting of the Visual Sciences Society, Naples, FL.
- Yiğit-Elliott, S., & Palmer, J. & Moore, C. M. (2011). The fate of unattended stimuli in the color flanker paradigm. Poster presented at the meeting of Object, Perception and Attention (OPAM), Seattle, WA.
- Yiğit-Elliott, S., & Palmer, J. & Moore, C. M. (2012). Understanding the failures of selective attention: The flanker congruency effect is consistent with failures of selection and not perceptual interactions. Poster presented at the meeting of the Visual Sciences Society, Naples, FL.
- Scharff, A., Palmer, J. & Moore, C. M. (2012). Divided attention limits perception of object shapes but not simple features. Poster presented at the meeting of the Visual Sciences Society, Naples, FL.
- Ernst, Z. R., Palmer, J. & Boynton, G. M. (2012). Dividing attention between two transparent motion surfaces results in a failure of selective attention. Poster presented at the meeting of the Visual Sciences Society, Naples, FL.
- Palmer, J, Scharff, A. & Moore, C. M. (2012). Divided attention for shape perception: limited by objects and locations? Talk presented at the meeting of the Psychonomics Society, Minneapolis, MN.



- Yiğit-Elliott, S., Palmer, J., & Moore, C. M. (2012). Failures of selection can account for color flanker effects. Poster presented at the meeting of the Psychonomics Society, Minneapolis, MN.
- Palmer, J., White, A. L. & Boynton, G. M. (2015). Divided Attention Effects in Perception: Dual-Task Deficits and Congruency Effects. Talk presented at the meeting of the Psychonomics Society, Chicago, IL.
- White, A. L., Palmer, J. & Boynton, G. M. (2016). Can you recognize two words at once? Characterizing capacity limits in the visual processing of words. Talk presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- Moore, C. M. & Palmer, J. (2016). The flanker task reveals sensory interactions rather than limitations of selective attention. Talk presented at the meeting of the Psychonomics Society, Boston, MA.
- Palmer, J. & Moore, C. M. (2017). Distinguishing among theories of selective attention using the flanker paradigm. Poster presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- White, A. L., Palmer, J. & Boynton, G. M. (2017). Evidence of serial processing in visual word recognition. Poster presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- Moreland, J. C., Palmer, J. & Boynton, G. M. (2017). Divided attention effects are larger for change detection than simple detection. Poster presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- White, A. L., Palmer, J. & Boynton, G. M. (2017). Can you recognize two words at once? Poster presented at the meeting of the European Conference on Visual Perception, Berlin, Germany.
- Moreland, J. C., Palmer, J. & Boynton, G. M. (2017). Are effects of divided attention in change detection due to memory and decision? Poster presented at the meeting of the European Conference on Visual Perception, Berlin, Germany.
- Moreland, J. C., Palmer, J. & Boynton, G. M. (2017). Evidence that Divided Attention Effects in Change Detection are not due to Perception. Poster presented at the meeting of Object, Perception and Attention (OPAM), Vancouver, BC.
- Petty, M., Palmer, J., Moore, C. M. & Boynton, G. M. (2017). Comparing the roles of perception and decision in spatial selective attention. Poster presented at the meeting of Object, Perception and Attention (OPAM), Vancouver, BC.

- White, A. L., Palmer, J. & Boynton, G. M. (2017). A test of divided attention: Can you recognize two words at once? Talk presented at the meeting of Object, Perception and Attention (OPAM), Vancouver, BC.
- White, A. L., Palmer, J. & Boynton, G. M. (2017). Evidence of a serial process in visual word recognition. Poster presented at the meeting of the Psychonomics Society, Vancouver, BC.
- White, A. L., Palmer, J. & Boynton, G. M. (2018). Probing the serial bottleneck in visual word recognition. Poster presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- Moreland, J. C., Palmer, J. & Boynton, G. M. (2018). The role of memory retrieval and decision when dividing attention in a Gabor patch change detection task. Poster presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- Petty, M., Palmer, J., Moore, C. M. & Boynton, G. M. (2018). Cueing effects for simple detection are best accounted for by a decision model of selective attention. Poster presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- White, A. L., Palmer, J., Yeatman, J. D. & Boynton, G. M. (2018). Capacity limits for word recognition in brain and behavior. Talk presented at the meeting of the Society for Neuroscience, San Diego, CA.
- Petty, M., Palmer, J., Moore, C. M. & Boynton, G. M. (2018). Cueing effects for simple detection are best accounted for by a decision model of selective attention. Poster presented at the meeting of the Psychonomics Society, New Orleans, LA.
- Popovkina, D. V., Palmer, J. & Boynton, G. M. (2019). How much does divided attention limit object recognition? Poster presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.
- White, A. L., Palmer, J., Boynton, G. M. & Yeatman, J. D. (2019). Parallel spatial channels for word recognition converge at a bottleneck in anterior word-selective cortex. Talk presented at the meeting of the Visual Sciences Society, St. Pete Beach, FL.

### **Principal-Investigator Research Grants**

Sigma Xi Grants-in-aid of Research Award, Testing alternative theories of visual localization, \$400, 1983.

Rackham Dissertation/Thesis Grant from the University of Michigan, Testing alternative theories of visual localization, \$1500, 1983-1984.

Grant from the Graduate School Research Fund of the University of Washington, Memory for visual attributes, \$10,300, 1985-1986.

National Eye Institute Equipment Grant with Drs. Teller and Buck, Instrumentation, \$63,000, 1985-1986.

Digital Equipment Corporation ISIS Grant, Graphics lab for human psychophysics, 50% discount on \$50,000 of equipment, 1986-1988.

Grant from the Graduate School Research Fund of the University of Washington, Memory for visual information II, \$6,300, 1986-1987.

Equipment Grant from the Graduate School Research Fund of the University of Washington, High-resolution graphics scope, \$3,400, 1986-1987.

Grant from the Graduate School Research Fund of the University of Washington with Corlene Ankrum, Perception and memory for objects and parts, \$4,500, 1990-1991.

Research Grant from the General Dynamics Corporation, Applied vision models, \$3,000, 1991.

Grant from the Royalty Research Fund of the University of Washington, Distinguishing parallel and serial processing in divided attention, \$40,000, 2009-2011.

### **Co-Investigator Research Grants, Contracts, Training Grants**

Olympus Project Grant from the University of Washington with Dr. Hunt, PI, and Dr. Loftus, A computerized laboratory for teaching human experimental psychology, \$13,000 & \$24,000 of equipment, 1986-1988.

National Eye Institute Training Grant with Dr. Hendrickson, PI, and 23 others, Basic and clinical training in vision research, \$207,000, 1987-1991.

Research Contract, Battelle, Seattle WA, Measurements of automobile headlamp masking of turn signals. \$13,500, 1993-1994.

Research Contract, OptiMetrics, Ann Arbor MI, Evaluating a human search model for military target acquisition, \$10,000, 1993-94.

Grant from the Royalty Research Fund of the University of Washington to Dr. Geoff Loftus (PI), Integrating theories of time and intensity, \$24,000, 1996.

National Eye Institute Grant to Dr. Davida Teller (PI), Infant spectral sensitivity, ~\$600,000, 1995-1999.

National Eye Institute Grant to Dr. Davida Teller (PI), Infant color vision, ~\$1,100,000, 2000-2004.

National Eye Institute Grant to Dr. Michael Shadlen (PI), Neural mechanisms of visual perception, ~\$800,000, 2001-2006.

National Eye Institute Grant to Dr. Michael Shadlen (PI), Neural mechanisms of visual perception, ~\$1,200,000, 2006-2011.

National Institute of Mental Health Grant to Dr. Cathleen Moore (PI), Attention and Oculomotor Control: Attentional Resolution, ~\$1,000,000, 2003-2009.

National Eye Institute Grant to Dr. Geoff Boynton (PI), The effects of attention in human visual cortex, \$1,890,000, 2014-2019.

University of Washington Bridge Funding to Dr. Geoff Boynton (PI), Bridge funding for the effects of attention in human visual cortex, \$100,000, 2019-2020.

## **Honors**

National Science Foundation Graduate Fellowship, 1979-1982

National Eye Institute Training Grant, 1982-1984

Invited to Attention and Performance XIV, 1990

Davida Teller Distinguished Faculty Award, 2008

Fellow in the American Psychological Society, 2008

## **Professional Organizations**

Psychonomic Society

American Psychological Society

Association for Research in Vision and Ophthalmology

Society for Mathematical Psychology

Optical Society of America

Vision Sciences Society

## **Professional Activities**

### **Editorial Board**

Journal of Vision, 2005-2008

### **Editor for Journal Special Issues**

Spatial Vision Issue on Visual Search and Attention, 2004

### **Ad Hoc Reviewer for Journals**

Canadian Journal of Psychology

Journal of Experimental Psychology: General

Journal of Experimental Psychology: Human Perception and Performance

Journal of Experimental Psychology: Learning, Memory and Cognition

Journal of Neuroscience

Journal of the Optical Society of America

Journal of Vision

Nature

Attention, Perception & Psychophysics

PLOS

Psychological Bulletin and Review

Psychological Review

Psychological Science

Quarterly Journal of Experimental Psychology

Spatial Vision

Vision Research

### **Ad Hoc Reviewer for Agencies**

Air Force Office of Scientific Research

National Science Foundation

National Institutes of Health

University of Washington Royalty Research Fund

### **Doctoral and Masters Students ( Chaired their committee )**

Aura Hanna, MS in Psychology, UW, 1985. Are there selective interference effects on recall of words encoded using imaginal or verbal strategies. Completed her PhD with Dr. Geoffrey Loftus; became an assistant professor at Virginia Commonwealth University.

Corlene Ankrum, Psychology, PhD in Psychology, UW, 1992. The effect of cueing on object and part comparisons. Became an assistant professor at Washington State University, Vancouver.

Dawn Aiken, MS in Psychology, UW, 1992. Comparing conjunction and disjunction visual search with equally similar targets.

Charles Traynor, PhD in Psychology, UW, 1995. The illusory contrast reversal: Evidence for spatially-local adaptation in the visual system.

Iris Zemach, PhD in Psychology, UW, 2007. The influence of prior stimuli on lightness judgments.

Alec Scharff, PhD in Psychology, UW, 2011. Visual object perception under divided attention.

Serap Yiğit-Elliott, PhD in Psychology, 2012. Three paradigms for selective attention in vision.

Miranda Johnson (formerly Miranda Petty). Completed her generals in Psychology Psychology, 2019.

### **Other Graduate Students ( helped supervise )**

- Jonathan Schooler, PhD in Psychology, UW, 1986. Verbalizing non-verbal memories: Some things are better left unsaid.
- AmyJo Bilson, PhD in Psychology, UW, 1987. Image size and resolution in face recognition.
- David Wheeler, PhD in Psychology, UW, 1989. Sensitivity of the peripheral vision to simulated aircraft ascent and descent.
- Sheri McFall, MS in Occupational Health, UW, 1991. Test-retest reliability of the test of visual perceptual skills with first grade children.
- Virginia Curulla, PhD in Education, UW, 1991. Aggression replacement training in the community for adult learning disabled offenders.
- Kathy Arehart, PhD in Speech and Hearing Sciences, UW, 1992. Effects of harmonic content on complex-tone frequency discrimination in hearing-impaired listeners.
- Roger Knight, PhD in Psychology, UW, 1992. Rod temporal mechanisms and cone pathways.
- Jill Bargones, PhD in Speech and Hearing Sciences, UW, 1992. Selective attention to sound frequency by infants and adults.
- Jennifer McLean, PhD in Psychology, UW, 1999. Processing capacity of visual perception and memory encoding.
- Sarina Hui-Lin Chien, PhD in Psychology, UW, 2003. Lightness Constancy in 4-month-old Infants: A Cue Elimination Approach.
- Maria Pereverzeva, PhD in Psychology, UW, 2006. Simultaneous color contrast in 4-month-old infants is revealed by a temporal modulation paradigm.
- Heather Knapp Paterson, PhD in Psychology, UW, 2006. Attentional capacity limitations on the identification of alphanumeric characters, English words, and American Sign Language signs.
- Nan-Ching Tai, PhD in Architecture, UW, 2009. Role of Light in Real and Pictorial Spaces: A Computational Framework to Investigate Scene-Based Luminance Distributions and Their Impact on Depth Perception.
- Barry Wark, PhD in Neurobiology and Behavior, UW, 2009. Optimal Adaptation Strategies in Sensory Neural Processing.
- Michael Perry, PhD in Psychology, UW, 2009. Testing Two Computational Models of Preference: The Person Trade-Off and Cumulative Prospect Theory.

- Laura Thomas, PhD in Psychology, UW, 2010. Exploring the Generality of Rod Hue Biases.
- Zach Ernst, PhD in Psychology, UW, 2010. Object-based attention: The effects of selective and divided attention.
- Kristie Fisher, PhD in Psychology, UW, 2011. Analogical Integration of Semantic and Arithmetic Relations in Mathematical Word Problems: Evidence from Event-related Brain Potentials.
- Eric Runeson, PhD in Psychology, UW, 2013. Effects of attention on physiological responses in human visual cortex.
- Peter Meilstrup, PhD in Neurobiology and Behavior, UW, 2014. Adding motion makes movement invisible: spatial interactions in visual motion.
- Shin Kira, PhD in Neurobiology and Behavior, UW, 2014. Neural mechanisms for decisions based on sequential samples of evidence.
- Jared LeClerc, PhD in Psychology, UW, 2014. Communicating Weather and Climate Uncertainty: An Exploration of the Benefits and Limitations of Inclusion of Uncertainty Estimates.
- Colin Beam, PhD in Psychology, UW, 2016. Models of human causal learning: review, synthesis, generalization.
- Joris Vincent, PhD in Psychology, UW, 2017. A two-stage theory of brightness and brownness induction.
- Timothy Rich, completed his generals in Rehabilitation Medicine, UW, 2016.
- Dean Pospisil, completed his generals in Neuroscience, UW, 2016.
- Raoni Demnitz, completed his generals in Psychology, UW, 2017.
- James "Kit" Moreland, PhD in Psychology, UW, 2019. Effects of divided attention for space and features.

### **Post-Doctoral Students ( helped supervise )**

Karen Dobkins, Post-Doc. in Dr. Teller's lab, 1993-1995. Relevant papers include: Dobkins, K. R. & Teller, D. Y. (1996). Infant contrast detectors are selective for direction of motion. Vision Research, 36, 281-294. Became an professor at UCSD.



John Kelly, Post-Doc. in Dr. Teller's lab, 1993-1996. Relevant papers include: Kelly, J. P., Borchert, K., & Teller, D. Y. (1997). The development of chromatic and achromatic contrast sensitivity in infancy as tested with the sweep VEP. Vision Research, 37, 2057-2072. Moved to Children's Hospital and Medical Center, Seattle, WA.

Barry Lia, Post-Doc. in Dr. Teller's lab, 1994-1998. Relevant work includes: Lia, B., Dobkins, K. R., Palmer, J. & Teller, D. Y. (1999). Infants code the direction of chromatic quadrature motion. Vision Research, 39, 1783-1794. Moved to the University Hospital, Seattle, WA

Tuwani Rasengane, Post-Doc. in Dr. Teller's lab, 1996-1998. Relevant work includes: Rasengane, T. A., Palmer, J. & Teller, D. T. (2000). Infant light adaptation shows Weber's law at photopic illuminances. Vision Research, 41, 359-373. Now practicing Optometry in South Africa.

Alex Huk, Post-Doc. in Dr. Shadlen's lab, 2001-2004. Relevant work includes: Palmer, J., Huk, A. C. & Shadlen, M. N. (2005). The effect of stimulus strength on the speed and accuracy of a perceptual decision. Journal of Vision, 5, 376-404. Is now an associate professor at University of Texas, Austin.

Alex White, Post-Doc with Dr. Geoff Boynton and myself 2015-2019. Relevant work includes: White, A. L., Palmer, J. & Boynton, G. M. (2018). Evidence of serial processing in visual word recognition. Psychological Science, 29, 1062-1071. Is now a postdoc at Stanford University.

Dina Popovkina, Post-Doc with Dr. Geoff Boynton and myself 2018-ongoing.

### **Undergraduate Students ( Advised their research project)**

Nobuko Murakami, BS in Psychology, 1989. Talk presented at the meeting of the Optical Society of America: Weber's law for separation is not due to eccentricity.

Eric Ruthruff, BS in Psychology, 1990. Project entitled: Measuring information-based and object-based limits on visual memory.

Britt Anderson, BS in Engineering, 1992, Paper entitled: Limited capacity for memory of multiple features within a single object.

Victor Nguyen, BS in Psychology, 2011, Project entitled: A filtering paradigm for selective attention in transparent motion.

James Pai, BS in Psychology, 2014. Paper submitted for publication: In shape perception, dividing attention is limited by objects and not location.

## Teaching Experience, Courses

Introductory Psychology, University of Michigan. Taught once in 1984, 30 students. Used H. Gleitman's text, Psychology.

Advanced Perception, University of Washington. Taught 6 times from 1985 to 1992, 10-30 students. Used L. Kaufman's text, Sight and Mind and extensive readings.

Sensation and Perception, University of Washington. Taught 6 times from 1985 to 1992, 50-100 students. Used R. Sekular and R. Blake's text, Perception.

Graduate Perception, University of Washington. Taught once in 1985, 4 students. Used extensive readings including sections of L. Kaufman's, Sight and Mind and G. Miller and P. Johnson-Laird's Language and Perception.

Sensation and Perception, Stanford University. Taught once in 1988, 180 students. Used R. Sekular and R. Blake's text, Perception.

Information Processing, University of Washington. Taught 4 times from 1987 to 1991, 10-30 students. Used C. Wicken's text, Engineering Psychology and Human Performance and extensive readings.

Advanced Perception, University of Washington. Taught 2 times from 2005 to 2007, 10-15 students. Used S. Palmer's Vision Science and extensive readings.

Vision and its Physiological Basis, University of Washington. Taught once in 2012, 12 students. Used D. Teller's unpublished Vision and the Visual System.

## Teaching Experience, Seminars

Visual Memory and Spatial Vision, University of Washington. Winter 1985, 9 students and faculty. Reviewed the visual memory literature with a focus on spatial judgments.

Color Vision: Postreceptoral channels and the silent substitution paradigm, University of Washington. Winter 1986, 8 students and faculty. Taught jointly with Drs. Davida Teller and Steve Buck.

Human and Computer Vision, University of Washington. Spring 1987, 5 students. Related computational models in human and computer vision.

Attention, University of Washington. Winter 1988, 11 students and faculty.  
Reviewed the attention literature with a focus on visual search.

Retinal Eccentricity and Visual Function, University of Washington. Spring 1988,  
14 students and faculty. Taught jointly with Dr. Davida Teller; we  
addressed work linking visual function to retinal anatomy.

The Psychophysics of Attention, Stanford University. Winter 1989, 10 students  
and faculty. In this seminar, we read extensively from M. Shaw's and N.  
Graham's work on visual attention.

Models of Computational Vision, University of Washington. Fall 1989, 13  
students and faculty. Taught jointly with Dr. Robert Haralick; we used  
human psychophysics to analyze machine vision models.

Measuring Attention, University of Washington. Spring 1990, 8 students and  
faculty. Taught jointly with Dr. Barry Kantowitz; we concentrated on  
understanding how dual tasks measure attention.

Norma Graham on Vision and Attention, University of Washington. Fall 1990, 14  
students and faculty. In this seminar, we read N. Graham's Visual  
Pattern's Analyzers from cover to cover.

Foundations of Attention, University of Washington. Fall 1991, 7 students and  
faculty. In this seminar, we analyzed definitional issues in attention.

Vision Lab, University of Washington. Summer 1993, 9 students and faculty.  
Taught jointly with Dr. Steve Buck; we taught the practical use of visual  
display and light calibration equipment.

The Neuroscience of Attention, University of Washington. Spring 1996. 12  
students and faculty. In this seminar, we surveyed the literature on the  
neural basis of attention phenomena.

The Psychophysics of Attention, Presented as part of the Computational  
Neuroscience Course at the Cold Spring Harbor Laboratories. Summer  
1996 and 1998. 30 Students and colleagues. Introduced quantitative  
work on attention in psychophysics as a complement to John Maunsell's  
presentation of neuroscience work on attention.

Survey of Attention, University of Washington. Winter, 1999. 15 students and  
faculty. In this seminar we read Hal Pashler's book, The Psychology of  
Attention from cover to cover. We had Hal "defend" his book at our last  
meeting.

Seminar on the Spatial Resolution of Attention, University of Washington. Spring  
2006. 8 students and faculty. Organized jointly with Dr. Cathleen Moore

of Penn State University. We reviewed in detail the literature on the spatial extent of visual attention.

Seminar on the Empirical Foundations of Attention, University of Washington. Spring 2007. 4 students and faculty. Organized jointly with Dr. Cathleen Moore of Penn State University. We reviewed seven key paradigms in selective and divided attention of perception and memory.

Seminar on Attention and Perceptual Organization, University of Iowa. Fall 2008. 10 students and faculty. Conducted with Dr. Cathleen Moore of University of Iowa. We reviewed the literature on the relation between perceptual organization and attention.