

Arthur Gilman Shapiro

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Professional Positions

American University

Associate Professor of Psychology Beginning Fall 2009

Bucknell University

Associate Professor of Psychology 2003-2009

Affiliate, Program in Neuroscience 2007-2009

Affiliate, Biomedical Engineering 2004-2009

Assistant Professor of Psychology 1998-2002

Florida Institute for Human and Machine Cognition

Visiting Research Scientist 2008-present

University of Cambridge, Corpus Christi College

External Director of Studies 2000-2001

(during junior leave from Bucknell University)

Lewis and Clark College

Assistant Professor of Psychology 1995-1998

Education

The University of Chicago

Post-doctoral fellow 1992-1995

Laboratory of Joel Pokorny and Vivianne C. Smith

Columbia University

Ph.D., Department of Psychology 1992

Laboratory of Qasim Zaidi

University of California, San Diego

B.A., Mathematics, with a specialization in Computer Science 1987

B.A., Psychology, with a specialization in Cognitive Science

Publications

Shapiro, A.G., Knight, E.J. & Lu, Z.L. (under review). "Drastically different percepts in foveal and peripheral vision."

Hamburger, K. & Shapiro, A.G. (under review). "Weaves and contrast-defined groups."

Hamburger, K. & Shapiro, A.G. (under review). "Weaves and the Hermann grid."

Shapiro, A.G. (2008). "Spatial and temporal influences on the contrast gauge asynchrony." *Vision Research*, Vol. 48, No. 26, pp. 2642-2648.

Shapiro, A. G. (2008). "Separating color from color contrast." *Journal of Vision*, Vol. 8, No. 1:8, pp. 1-18. <http://journalofvision.org/8/1/8>, doi:10.1167/8.1.8.

Shapiro, A.G. & Hamburger, K. (2007). "Grouping by contrast—figure-ground segregation is not necessarily fundamental." *Perception*, Vol. 36, No. 7, pp. 1104-1107.

Publications (cont.)

- Shapiro, A. G., Charles, J. P., & Shear-Heyman, M. (2005). "Visual illusions based on single-field contrast asynchronies." *Journal of Vision*, Vol. 5, No. 10, pp. 764-782. <http://journalofvision.org/5/10/2/>.
- Shapiro, A. G., D'Antona, A. D., Smith, J. B., Belano, L. A., & Charles, J. P. (2004). "Induced contrast asynchronies may be useful for luminance photometry." *Visual Neuroscience*, Vol. 21, pp. 243-247.
- Shapiro, A. G., D'Antona, A. D., Charles, J. P., Belano, L. A., Smith, J. B., & Shear-Heyman, M. (2004). "Induced contrast asynchronies." *Journal of Vision*, Vol. 4, No. 6, pp. 459-468. <http://journalofvision.org/4/6/5/>.
- Shapiro, A. G., Hood, S. M., & Mollon, J. D. (2003). "Temporal sensitivity and contrast adaptation." *Normal and Defective Colour Vision*, Oxford University Press.
- Shapiro, A. G., Beere, J. L., & Zaidi, Q. (2003). "Time course of S-cone system adaptation to simple and complex fields." *Vision Research*, Vol. 43, pp. 1135-1147.
- Shapiro, A. G. (2002). "Cone-specific mediation of rod system sensitivity." *Investigative Ophthalmology and Visual Sciences*, Vol. 43, No. 1, pp. 898-905.
- Shapiro, A. G., Beere, J. L., & Zaidi, Q. (2001). "Time course of adaptation along the RG cardinal axis." *Color: research and application*, Vol. 26, pp. S43-S47.
- Eisner, A., Shapiro, A. G., & Middleton, J. A. (1998). "Equivalence between temporal frequency and modulation depth in flicker response suppression: analysis of the three-process model of adaptation." *Journal of the Optical Society of America*, Vol. 15, No. 8, pp. 1987-2002.
- Shapiro, A. G., Pokorny, J., & Smith, V. (1996). "Cone-rod receptor spaces with illustrations that use CRT phosphor and light-emitting-diode spectra." *Journal of the Optical Society of America*, Vol. 13, No. 12, pp. 2319-2328.
- Shapiro, A. G., Pokorny, J., & Smith, V. (1996). "Conditional variables of the scotopic threshold-versus-illuminance curve." *Color: research and application*, Vol. 21, pp. 80-85.
- Ábráham, G., Körösi, H., Schanda, J., Shapiro, A. G., & Wenzel, K. (1995). "Anomalies in additive color matches." *Color: research and application*, Vol. 20, pp. 235-249.
- Shapiro, A. G., Pokorny, J., & Smith, V. (1994). "Rods and the 10 color-matching functions." *Color: research and application*, Vol. 19, pp. 236-245.
- Zaidi, Q. & Shapiro, A. G. (1993). "Adaptive orthogonalization of opponent-color signals." *Biological Cybernetics*, Vol. 69, No. 5/6, pp. 415-428.
- Shapiro, A. G., Pokorny, J., & Smith, V. (1993). "Rod activity and large-field color-matching functions." *Commission Internationale de l'Éclairage (CIE), Advanced Colorimetry Report x007*, pp. 65-70.
- Greenstein, V., Shapiro, A. G., Zaidi, Q., & Hood, D. (1993). "Chromatic and luminance sensitivity in diabetes and glaucoma." *Journal of the Optical Society of America*, Vol. 10, No. 8, pp. 1785-1791.
- Greenstein, V., Shapiro, A. G., Zaidi, Q., & Hood, D. (1992). "Sites of disease action in diabetics." *Investigative Ophthalmology & Visual Science*, Vol. 33, pp. 2781-2790.
- Shapiro, A. G. & Zaidi, Q. (1992). "The effects of prolonged temporal modulation on the differential response of color mechanisms." *Vision Research*, Vol. 32, pp. 2065-2075.
- Zaidi, Q., Shapiro, A. G., & Hood, D. (1992). "The effect of adaptation on the differential sensitivity of the s-cone color system." *Vision Research*, Vol. 32, No. 7, pp. 1297-1318.
- Extended abstracts*
- Shapiro, A. G., Pokorny, J., & Smith, V. (1995). "Defining rod-photoreceptor space." In *The annual report of the pan-chromatic society*.
- Zaidi, Q. & Shapiro, A. G. (1992). "Combinations of signals from opponent color mechanisms." In *Advances in Color Vision, Technical Digest* (Optical Society of America, Washington, D.C.), Vol. 4, pp. 201-203.

Reviews

Jenness, J. & Shapiro, A. G. (1994). "Review of the 1993 Optical Society of America Annual Meeting." *Color: research and application*, Vol. 19, pp. 231-232.

Grants

"Effects of spatial scale on motion and lightness" (in preparation)
 "Defeating camouflage with evolutionary color algorithms" (in preparation)
 "First- and second-order color vision" (in preparation)
 National Institutes of Health (NIH), AREA Award, \$100,000 2000-2003
 "Visual Adaptation at Mesopic Light Levels"
 Medical Research Foundation of Oregon, \$25,000 1995-1997
 "Color Vision and the Interaction of Photoreceptor Signals"
 NIH, Individual National Research Service Award 1992-1995
 "Temporal Properties of the L- and M-Cone Systems"

Best Illusion of the Year contest, Top 10

Dramatically Different Percepts between Foveal and Peripheral Vision (2008), Knight, E. J., Shapiro, A. G., & Lu, Z. L.
 Perpetual Collisions (2008), Shapiro, A. G. & Knight, E. J.
 Where Has All the Motion Gone? (2007), **Third prize**, Shapiro, A. G. & Knight, E. J.
 Swimmers, Eels and Other Gradient-Gradient Illusions (2007), Knight, E. J. & Shapiro, A. G.
 'Weaves' and the Hermann Grid (2007), Hamburger, K. & Shapiro, A. G.
 Motion-Illusion Building Blocks (2005), **First prize**, Shapiro, A. G. & Charles, J. P.

Invited presentations and public lectures

"Color is slow; color contrast is fast." Keynote lecture, International Colour Vision Society Conference, Braga, Portugal (July 2009).
 "Separating color from color contrast: the implications for motion and brightness illusions." Centre for Visual Science, York University, Toronto, Canada (February 2009).
 "Why are we surprised by only some of the things we see? Spatial contrast, color contrast, and visual illusions." Florida Institute for Human and Machine Cognition (May 2008).
 "Contrast, Color, and Neuroscience." Lehigh University, Biology department (March 2008).
 "Separating color from color contrast." Rochester Institute of Technology (April 2007).
 "Distortions of reality: what visual illusions can tell us about the brain." Presentation to the Senior Bucknellians, Lewisburg, PA (March 2007).
 "Counter shading, camouflage, and the design of visual illusions." Presentation at the International symposium for biologically inspired design in science and engineering, Atlanta, GA (May 2006).
 "Visual illusions and an advanced seminar in visual perception." Presentation of senior seminar projects for Bucknell University Trustee group (April 2006).
 "Visual perception and the importance of the campus wireless network." Presentation for U.S. Congressional Representative and staff visit to Bucknell University (February 2006).
 "Why physicists and mathematicians should be interested in Psychology." Combined colloquia for the Mathematics and Physics departments, Bucknell University (October 2005).
 "First- and Second-Order Color Vision." Center for Neuroscience, University of California, Davis (April 2005).
 "New Class of Illusions based on Contrast Asynchronies." Department of Psychology, University of California, Davis (April 2005).

- "Visual Perception." Presentation for Lewisburg Area High School's psychology class (Spring 2004, 2005, 2006, 2007, 2008).
- Faculty presentation for the Parents' Board of Bucknell University (February 2004).
- Faculty lecture for the Bucknell Board of Trustees (November 2003).
- "Why physicists should be interested in Psychology, II." Physics Coffee Talk, Bucknell University (November 2003).
- "Temporal sensitivity and contrast adaptation," Colloquium given for the Applied Vision Research Center, City University of London (August 2001).
- "Cone-specific mediation of rod system sensitivity." Colloquium given for the Kenneth Craik Club of the University of Cambridge (March 2001).
- "Why physicists should be interested in Psychology: examples from visual adaptation and color perception." Physics Coffee Talk, Bucknell University (April 1999).
- "Psychophysics in the medical environment." A presentation to the residents of the medical school of the Oregon Health Sciences University (June 1998).
- "Color vision, color matching, and color space." Physics and Mathematics symposium, Lewis and Clark College (December 1997).
- "Rod-mediated vision at mesopic light levels." Current Research Issues in Ophthalmology seminar, Oregon Health Sciences University (November 1997).
- "Rod-photoreceptor contribution to color perception." Optical Society of America Annual Meeting, Long Beach, CA (October 1997).
- "Rods and the 10 color-matching functions." Shapiro, A. G., Pokorny, J., & Smith, V. Inter-Society Color Council Annual Meeting, Newport, RI (April 1993).

Conference Presentations

- Shapiro, A. G., Knight, E. J., & Lu, Z. L. (2008). "Feature blur in peripheral vision." Society for Neuroscience, Washington D.C.
- Shapiro, A. G., Knight, E. J., & Lu, Z. L. (2008). "Spatial scale models of lightness illusions: contrast, anchoring, and tunable filters." Vision Sciences Society, Naples, FL. <http://journalofvision.org/8/6/288/>.
- Knight, E. J., Shapiro, A. G., & Lu, Z.L. (2008). "Drastically different percepts of five illusions in foveal and peripheral vision reveal their differences in representing visual phase." Vision Sciences Society, Naples, FL. <http://journalofvision.org/8/6/967/>.
- Shapiro, A. G. (2007). "Temporal and spatial factors that influence luminance gauge photometry." Festschrift for Joel Pokorny and Vivianne Smith, Chicago, IL.
- Shapiro, A. G., Smith, J., & Knight, E. (2007). "Spatial scale and simultaneous contrast phenomena." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/7/9/555/>.
- Hamburger, K. & Shapiro, A.G. (2007). "The Hermann grid is an equiluminant weave." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/7/9/236/>.
- Shapiro, A. G., & Smith, J. S. (2006). "Are simultaneous contrast phenomena a product of the visual systems representation of spatial scale?" Fall Vision Meeting, Rochester, NY. <http://journalofvision.org/6/13/22/>.
- Shapiro, A. R., & Shapiro, A. G. (2006). "A multiscale filtering model can explain brightness motion in single-field contrast asynchronies." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/6/6/713/>.
- Shapiro, A. G. (2005). "First-order color vision is slow; second-order color vision is fast." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/5/8/96/>.

- Corballis, P. M., Parks, N. A., Holder, M. K., & Shapiro A. G. (2005). "Identification of luminance and contrast modulation signatures in the VEP." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/5/8/488/>.
- Shapiro, A. G., Charles, J. P., Schatten, H. (2004). "Luminance gauge photometry." Fall Vision Meeting, Rochester, NY. <http://journalofvision.org/4/11/81/>.
- Shapiro, A. G., Shear-Heyman, M., Milanak, M., Leaver, A., & Charles, J. P. (2004). "Thin edges and the induced contrast asynchrony." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/4/8/349/>.
- Shapiro, A. G. & D'Antona, A. D. (2003). "Perceived Contrast Asynchrony and Independent Directions in Color Space." International Colour Vision Society, Seattle, WA.
- Shapiro, A. G. & D'Antona, A. D. (2003). "Independent Directions in Color Space Identified Through Contrast Asynchrony." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/3/9/313/>.
- Shapiro, A. G., Baldwin, L.A & Mollon, J. D. (2002). "The S and L-M chromatic systems have matched temporal processing characteristics only at low-light levels." European Conference for Visual Perception, Glasgow, Scotland.
- Shapiro, A. G., Baldwin, L. & Zaidi, Q. (2002). "Time Course of L-M System Adaptation to Simple and Complex Fields." Vision Sciences Society, Sarasota, FL. <http://journalofvision.org/2/7/142/>.
- Shapiro, A. G., Hood, S.M., & Mollon, J.D. (2001). "Temporal frequency and contrast adaptation." The Thomas Young Symposium, Cambridge, England.
- Johnson, J. J., Lowry, B., Eliseuson, S., & Shapiro, A. G. (2001). "Phantom-type referred sensations in a non-amputee." Cognitive Neuroscience Society, New York, NY.
- Stasson, S. W., Pokorny J., Smith V. C., & Shapiro, A. G. (2001). "Reaction times to rod and cone incremental and decremental stimuli." ARVO Annual Meeting, Fort Lauderdale, FL. *Investigative Ophthalmology Suppl.*, Vol. 42.
- Shapiro, A. G., Beere, J, & Creasy, D. (2000). "Adaptation stages in the S-cone system." United Engineering Foundation Conference, Tuscany, Italy. In *The proceedings of the United Engineering Foundation Conference on Sensors and Sensing*.
- Shapiro, A.G., Beere, J. L., & Zaidi, Q. (2000). "Time course of higher order adaptation in the S-(L+M) color system." ARVO Annual Meeting, Fort Lauderdale, FL. *Investigative Ophthalmology Suppl.*, Vol. 41.
- Shapiro, A.G., Beere, J. L., & Zaidi, Q. (1999). "Temporal properties of adaptation stages along the S-(L+M) cardinal axis." The 15th symposium of the International Colour Vision Society, Göttingen, Germany.
- Shapiro, A.G., Chessman, L. J., Knight, R., & Buck, S. L. (1998). "Cone contribution to the rod threshold versus illuminance function." ARVO Annual Meeting, Fort Lauderdale, FL. *Investigative Ophthalmology Suppl.*, Vol. 39.
- Fowler, G. A., Buck, S. L., Shapiro, A.G., & Knight, R. (1997). "Linear opponent models of rod influence on hue perception." ARVO Annual Meeting, Fort Lauderdale, FL. *Investigative Ophthalmology Suppl.*, Vol. 38, No. 4, p. 453.
- Reyes, N. & Shapiro, A.G. (1997). "Localization and detection thresholds in one- and two-interval tasks." Western Psychological Association, Seattle, WA.
- Shapiro, A. G., Pokorny, J., & Smith, V. (1996). "Cone-Rod Receptor Spaces." ARVO Annual Meeting, Fort Lauderdale, FL. *Investigative Ophthalmology Suppl.*, Vol. 37.
- Shapiro, A. G., Pokorny, J., & Smith, V. (1994). "Lines of equal rod activity in color space." Optical Society of America Annual Meeting, Dallas, TX.

- Shapiro, A. G., Pokorny, J., & Smith, V. (1994). "The effects of viewing color CRT monitors on the rod-photoreceptors." Inter-Society Color Council Annual Meeting, Detroit, MI.
- Shapiro, A. G., Smith, V., & Pokorny, J. (1993). "Rod contribution to the 10 color-matching functions." Optical Society of America Annual Meeting, Toronto, Ont. *OSA Technical Digest*, Vol. 24, p. 83.
- Shapiro, A. G., Smith, V., & Pokorny, J. (1993). "Rods and color-matching functions." Presented by V. Smith at the Commission Internationale de l'Eclairage (CIE) Symposium on Advanced Colorimetry, Vienna, Austria.
- Zaidi, Q. & Shapiro, A. G. (1993). "Functional models of adaptation to color mechanisms." ARVO Annual Meeting, Sarasota, FL. *Investigative Ophthalmology Suppl.*, Vol. 34, No. 4, p. 765.
- Shapiro, A. G. & Zaidi, Q. (1992). "Prolonged temporal modulation and the interaction of color mechanisms." Optical Society of America Annual Meeting, Albuquerque, NM. *OSA Technical Digest*, Vol. 23, p. 51.
- Greenstein, V., Ritch, R., Shapiro, A., Zaidi, Q., & Hood, D. (1992). "The effects of glaucoma on cone pathways." ARVO Annual Meeting, Sarasota, FL. *Investigative Ophthalmology Suppl.*, Vol. 33, No. 4, p. 1383.
- Shapiro, A. G. & Zaidi, Q. (1991). "The effects of prolonged temporal modulation on the response of color mechanisms." ARVO Annual Meeting, Sarasota, FL. *Investigative Ophthalmology Suppl.*, Vol. 32, No. 4, p. 842.
- Greenstein, V., Shapiro, A. G., Carr, R., Harooni, M., Hood, D., Ritch, R., & Zaidi, Q. (1991). "Chromatic and achromatic threshold changes associated with ocular disorders." ARVO Annual Meeting, Sarasota, FL. *Investigative Ophthalmology Suppl.*, Vol. 32, No. 4, p. 1231.
- Shapiro, A. G., Zaidi, Q., & Hood, D. (1990). "Adaptation in the red-green (l-m) color system." ARVO Annual Meeting, Sarasota, FL. *Investigative Ophthalmology Suppl.*, Vol. 31, No. 4, p. 262.
- Greenstein, V., Thomas, S., Shapiro, A. G., Zaidi, Q., & Hood, D. (1990). "A comparison of techniques for measuring s-cone sensitivity in diabetics." ARVO Annual Meeting, Sarasota, FL. *Investigative Ophthalmology Suppl.*, Vol. 31, p. 423.
- Zaidi, Q., Hood, D., & Shapiro, A. G. (1989). "The time course of sensitivity change in s-cone color mechanisms." ARVO Annual Meeting, Sarasota, FL. *Investigative Ophthalmology Suppl.*, Vol. 30, No. 4, p. 221.
- Shapiro, A. G., Meck, W. H., & Williams, C. L. (1988). "Choline supplementation during development: time frames for spatial memory facilitation." Society of Neuroscience Annual Meeting, Toronto, Ont. *Neuroscience Suppl.*, Vol. 14, p. 58.
- Meck, W. H., Shapiro, A. G., & Williams, C. L. (1988). "Prenatal choline exposure produces long-term improvement in temporal processing." Society of Neuroscience Annual Meeting, Toronto, Ont. *Neuroscience Suppl.*, Vol. 14, p. 58.
- Meck, W. H., Gibbon, J., Allan, L., & Shapiro, A. G. (1988). "Psychometric functions with and without reversals in temporal bisection." Psychonomic Society Annual Meeting, Chicago, IL. *Psychonomic Society Suppl.*, Vol. 29, p. 13.

Presentations for Vision Sciences Society Demonstration Night

- Knight, E. J., Shapiro, A. G., & Lu, Z.L. (2008). "Illusions that illustrate fundamental differences between foveal and peripheral vision." Naples, FL.
- Shapiro, A. G., & Knight, E. J. (2008). "Perpetual collisions, long-range argyles, and other illusions." Naples, FL.
- Shapiro, A. G., Knight, E. J., & Johnson, T. (2007). "'Where has all the motion gone?' and other visual effects." Sarasota, FL.
- Hamburger, K. & Shapiro, A.G. (2007). "Weaves." Sarasota, FL.

- Shapiro, A.G., Knight, E, J, Palmor, Y., & Mancusi, D. (2006). Swimmers, eels and other gradient-gradient illusions. Sarasota, FL.
- Shapiro, A. G., & Charles, J. P. (2005). "Contrast asynchronies: 57 varieties." Sarasota, FL.
- Shapiro, A. G. & D'Antona, A. D. (2004). "The Winking Effect." Sarasota, FL.

Conference and Symposia Organizing

- Co-curator of Demo Night for the Vision Sciences Society Annual Meeting, 2007, 2008
(along with Richard Brown, Exploratorium, and Shin Shimojo, Cal Tech)
- Session chair, Lightness and brightness session, Vision Sciences Society Annual Meeting (May 2007).
- Member of the organizing committee, International Colour Vision Society Bi-Annual Meeting, Cambridge, England (July 2001).
- Co-organizer and chair of symposium entitled "Long-range interaction in the visual system."
Optical Society of America Annual Meeting, Santa Clara, CA (October 1999).
- Co-organizer and chair of symposium entitled "Vision in Virtual Environments." Optical Society of America Annual Meeting, Portland, OR (September 1995).

Teaching Experience

- Introduction to Neuroscience (2008, 2009)
- Supervisor, University of Cambridge (2000-01)
Part Ib, Psychology: Corpus Christi College, Magdalene College
Medical and Veterinary Sciences, Psychology: Corpus Christi College
Part II Vision, Experimental Psychology: Gonville and Caius College, Pembroke College, New College, Trinity College
- Perception (1995-2000, 2002-09)
- Perception Laboratory (1999-2001, 2003-07)
- Advanced Perception (1999, 2000, 2002, 2005, 2006, 2008, 2009)
- Cognition (1996-98)
- Statistics (1995-2000)
- Advanced Statistics (1997)
- Introduction to Psychology (1996, 1998, 2001, 2003, 2006, 2007, 2008)
- First-year seminar: Distortions of Reality (2002, 2006, 2008)

Journal Editorial Board

- Perception and Psychophysics*, consulting editor (2008-present)

Journal and Grant Reviewing

- Color: research and application*
- Department of Veterans Affairs
- Journal of Imaging Science and Technology*
- Journal of Vision*
- National Science Foundation
- Perception*
- Perception and Psychophysics*
- Vision Research*
- Visual Neuroscience*

Other Professional Activities

Departmental Representative, Institutional Review Board, Bucknell University (2008-2009)
Participant Pool Coordinator, Psychology Department, Bucknell University (2008-2009)
Faculty Adviser for BRAIN (Bucknell research advocates in neuroscience), Bucknell University (2008-2009)
Judge for the 2006 best visual illusion of the year contest, Neural Correlate Society
Curriculum Committee, Bucknell University (2005, 2006)
Committee on Admission and Financial Aid, Bucknell University (2001-04; chair, 2002-04)
Departmental Library Committee, Bucknell University (2001-2004, 2005-2008)
Selection Committee for Godlove Award, Intersociety Color Council (1999, 2001, 2003)

Professional Societies and Memberships

International Colour Vision Society
Optical Society of America
Psychonomic Society
Society for Neuroscience
Vision Sciences Society
Faculty for Undergraduate Neuroscience