

Arthur Gilman Shapiro

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Professional Positions

Bucknell University

Associate Professor of Psychology	2003-present
Affiliate, Program in Neuroscience	2007-present
Affiliate, Biomedical Engineering	2004-present
Assistant Professor of Psychology	1998-2002

University of Cambridge, Corpus Christi College

External Director of Studies (during junior leave from Bucknell University)	2000-2001
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Lewis and Clark College

Assistant Professor of Psychology	1995-1998
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Education

The University of Chicago

Post-doctoral fellow Laboratory of Joel Pokorny and Vivianne C. Smith	1992-1995
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Columbia University

Ph.D., Department of Psychology Laboratory of Qasim Zaidi	1992
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University of California, San Diego

BA, Mathematics, with a specialization in Computer Science BA, Psychology, with a specialization in Cognitive Science	1987
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Editorial Positions and Administrative Positions outside of the university

Consulting editor, *Perception and Psychophysics*

Co-curator of Demo Night for the Vision Sciences Society

(along with Richard Brown, Exploratorium, and Shin Shimojo, Cal Tech)

Awards, Best Illusion of the Year contest

Third prize, Best Illusion of the Year Contest, Neural Correlate Society (May 2007).

First prize, Best Illusion of the Year Contest, European Conference on Visual Perception and the Science Museums of A Coruna, Spain (August 2005).

Grants

Motion, Lightness and spatial scale (in preparation)

Defeating camouflage with evolutionary color algorithms (in preparation)

National Institutes of Health (NIH), AREA Award, \$100,000 "Visual Adaptation at Mesopic Light Levels"	2000-2003
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Medical Research Foundation of Oregon, \$25,000 "Color Vision and the Interaction of Photoreceptor Signals"	1995-1997
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NIH, Individual National Research Service Award "Temporal Properties of the L- and M-Cone Systems"	1992-1995
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Publications

- Shapiro A.R. & Shapiro, A.G. (in preparation). "Near- and long-range contrast interactions."
- Shapiro, A.G. (under review). "Spatial and temporal factors that influence contrast gauge photometry."
- 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). 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.
- 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., and 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'Eclairage (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.

Invited presentations and public lectures

- "Contrast, Color, and Neuroscience." Lehigh University, Biology department (scheduled 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).
- "First- and Second-Order Color Vision." Center for Neuroscience, University of California, Davis (April 2005).
- "Visual Perception." Presentation for Lewisburg Area High School's psychology class (2004, 2005, 2006).
- 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 and Abstracts

- 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.
- Hamburger, K. & Shapiro, A.G. (2007). "The Hermann grid is an equiluminant weave." Vision Sciences Society, Sarasota, FL.
- Shapiro, A. G., Knight, E., Johnson, T. (2007). "'Where has all the motion gone?' and other visual effects." Presentation for visual illusion demonstration night, Vision Sciences Society, Sarasota, FL.
- Hamburger, K. & Shapiro, A.G. (2007). "Weaves." Presentation for visual illusion demonstration night, Vision Sciences Society, Sarasota, FL.
- 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.
- 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., Knight, E, J, Palmor, Y., Mancusi, D. (2006). Swimmers, eels and other gradient-gradient illusions. Presentation for visual illusion demonstration night, Vision Sciences Society, Sarasota, FL.
- Shapiro, A. G. & Charles, J. P. (2005). "Motion-Illusion Building Blocks." European Conference on Visual Perception, A Coruna, Spain.
- 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., Charles, J. P. (2004). "Contrast asynchronies: 57 varieties." Presentation for visual illusion demonstration night, Vision Sciences Society, Sarasota, FL.

- 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). "The Winking Effect." Presentation for visual illusion demonstration night, Vision Sciences Society, Sarasota, FL.
- 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.

Conference and Symposia Organizing

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

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, 2002-07)

Perception Laboratory (1999-2001, 2003-07)

First-year seminar: Distortions of Reality (2002, 2006)

Advanced Perception (1999, 2000, 2002, 2005, 2006)

Cognition (1996-98)

Statistics (1995- 2000)

Advanced Statistics (1997)

Introduction to Psychology (1996, 1998, 2001, 2003, 2006, 2007)

Journal and Grant Referee

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

Professional Societies and Memberships

International Colour Vision Society

Optical Society of America

Psychonomic Society

Society for Neuroscience

Vision Sciences Society

Other Professional Activities

Judge for the 2006 best visual illusion of the year contest

Curriculum Committee, Bucknell University (2005, 2006)

Committee on Admission and Financial Aid, Bucknell University (2001-04; chair from 2002-04)

Departmental Library Committee, Bucknell University (2001-2004, 2005-present)

Selection Committee for Godlove Award, Intersociety Color Council (1999, 2001, 2003)