

Arthur Gilman Shapiro
Department of Psychology, American University
4400 Massachusetts Avenue NW, Washington, D.C. 20016
arthur.shapiro@american.edu

Administrative Positions at American University

Chair, Department of Computer Science	2015-2016
Director, Behavior, Cognition, and Neuroscience (BCAN) program	2015-2016, 2013-2014
Co-Director, Collaborative for Applied Perceptual Research and Innovation (CAPRI)	2014-

Academic Positions

American University

Joint Appointment as Professor of Computer Science and Psychology	2016-
Professor of Psychology	2011-
Affiliate, Department of Mathematics and Statistics	2010-
Associate Professor of Psychology	2009-2011

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

University of Cambridge, Corpus Christi College

External Director of Studies	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, Ophthalmology and Visual Science	1992-1995
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Columbia University

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

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

Grants (funded and under review)

National Science Foundation, "Do I See What You See? (DISWYS), Explorations in Subjective Perception." Co-PI and Lead scientific investigator	Submitted (2016)
Oculus Corporation, "Motion in large field of view VR displays: Software for personalization and cue enhancement" Co-PI	Submitted (2016)
National Institutes of Health, AREA Award, \$409,404 "Separating the Visual Response to Color from the Visual Response to Color Contrast"	2010-2013
National Institutes of Health, AREA Award, \$100,000 "Visual Adaptation at Mesopic Light Levels"	2000-2003
Medical Research Foundation of Oregon, \$25,000 "Color Vision and the Interaction of Photoreceptor Signals"	1995-1997
National Institutes of Health, Individual National Research Service Award "Temporal Properties of the L- and M-Cone Systems"	1992-1995

Patent Applications

- Shapiro, A.G. (2016; pending). Directional illusions based on motion pixels and uses thereof.
 Shapiro, A.G & Newport, J. (2016; pending). Object-rotating apparatus and methods of using.

Publications

Books

- Shapiro, A.G. & Todorovi□, D. (Eds.). (2016, in production). *Oxford Compendium of Visual Illusions*. Oxford: Oxford University Press.

Journal Articles

- Flynn, O. J. & Shapiro, A.G. (Submitted). The Perpetual Diamond Phenomenon: Contrast Reversals and Motion Analysis.
- Dixon, E. L. & Shapiro, A.G. (Accepted pending minor revisions). Spatial Frequency, Color Constancy and the Dress. *Journal of Vision*.
- Shapiro, A.G. (2016, in press). Contrast Contrast Asynchrony. In A.G. Shapiro & D. Todorovi□ (Eds.), *Oxford Compendium of Visual Illusions*. Oxford: Oxford University Press.
- Shapiro, A.G. & Kistler, W. (2016, in press). Color Wagon Wheel. In A.G. Shapiro & D. Todorovi□ (Eds.), *Oxford Compendium of Visual Illusions*. Oxford: Oxford University Press.
- Shapiro, A.G. (2015). Star Wars Scroll Illusion. *i-Perception*, 6(5), 1-8. doi: 10.1177/2041669515604060
- Shapiro, A.G., Caplovitz, G.P. & Dixon, E.L. (2014). Feature- and Face-Exchange illusions: new insights and applications for the study of the binding problem. *Frontiers in Human Neuroscience*, 8(804). doi: 10.3389/fnhum.2014.00804
- Rose-Henig, A. & Shapiro, A.G. (2014). Contrast-Contrast Asynchronies. *Journal of the Optical Society of America, A*, 31(4): A232-A238.
- Dixon, E.L. & Shapiro, A.G. (2014). The paradoxical effect of spatially homogenous transparent fields on simultaneous contrast illusions. *Journal of the Optical Society of America, A*, 31(4): A307-A313.
- Dixon, E.L., Shapiro, A.G., & Lu, Z.L. (2014). Scale-invariance in brightness illusions implicates object-level visual processing. *Scientific Reports*, 4, Article Number 3900. doi:10.1038/srep03900
- Flynn, O. & Shapiro A.G. (2014). Adelson's Argyle Illusion and Cornsweet Edges. *Psihologija*, 47, 353-588.
- Flynn, O. & Shapiro A.G. (2013). The separation of monocular and binocular contrast. *Vision Research*, 93, 19-28.
- Hamburger, K., Dixon E. L., & Shapiro, A.G. (2013). From Hermann's grid to Spillmann's weaves. In A. Geremek, M.W. Greenlee, & S. Magnussen (Eds.), *Perception Beyond Gestalt: Progress in Vision Research* (pp.118-127). NY: Psychology Press.
- Shapiro, A.G. & Lu, Z.L. (2011). Relative Brightness in Natural Images can be Accounted for by Removing Blurry Content. *Psychological Science*, 22(11), 1452-1459.
- Caplovitz, G., Shapiro, A.G., & Stroud, S. (2011). The maintenance and disambiguation of object representations depend upon feature contrast within and between objects. *Journal of Vision*, 11(14), 1-14. doi: 10.1167/11.14.1. <http://www.journalofvision.org/content/11/14/1>
- Shapiro, A.G., Knight, E.J., & Lu, Z.L. (2011). A First- and Second-Order Motion Energy Analysis of Peripheral Motion Illusions Leads to Further Evidence of "Feature Blur" in Peripheral Vision. *PLoS ONE*, 6(4), e18719. doi:10.1371/journal.pone.0018719
- Shapiro, A.G. & Hamburger, K. (2011). What makes an illusion an illusion? An examination of contrast information in grouping and grid phenomena. In E. Charles (Ed.), *Psychological Realism: A New Look at an Old Theory* (pp. 81-105). Piscataway, NJ: Transaction Publishers.
- Shapiro, A.G., Lu, Z.L., Huang, C.B., Knight, E. J., & Ennis, R. (2010). Transitions between central and peripheral vision create spatial/temporal distortions: a hypothesis concerning the perceived break of the curveball. *PLoS ONE*, 5(10): e13296. doi:10.1371/journal.pone.0013296
- Shapiro, A.G. & Leaver, A.M. (2010). Edges can eliminate the appearance of the contrast asynchrony. *Ophthalmic and Physiological Optics*, 30(5), 534-544.
- Hamburger, K. & Shapiro, A.G. (2009). Spillmann's weaves are more resilient than Hermann's grid. *Vision Research*, 49(16), 2121-30.
- Shapiro, A.G. & Knight, E. J. (2008). Spatial and temporal influences on the contrast gauge asynchrony. *Vision Research*, 48(26), 2642-2648.
- Shapiro, A.G. (2008). Separating color from color contrast. *Journal of Vision*, 8(1):8, 1-18. <http://journalofvision.org/8/1/8>, doi:10.1167/8.1.8

Journal Articles (cont.)

- Shapiro, A.G. & Hamburger, K. (2007). Grouping by contrast—figure-ground segregation is not necessarily fundamental. *Perception*, 36(7), 1104-1107.
- Shapiro, A.G., Charles, J.P., & Shear-Heyman, M. (2005). Visual illusions based on single-field contrast asynchronies. *Journal of Vision*, 5(10), 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*, 21, 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*, 4(6), 459-468. <http://journalofvision.org/4/6/5/>
- Shapiro, A.G., Hood, S.M., & Mollon, J.D. (2003). Temporal frequency and contrast adaptation. In J.D. Mollon, J. Pokorny, & K. Knoblauch (Ed.), *Normal and Defective Colour Vision* (pp. 138-144). Oxford: 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*, 43(10), 1135-1147. [http://dx.doi.org/10.1016/S0042-6989\(02\)00687-9](http://dx.doi.org/10.1016/S0042-6989(02)00687-9)
- Shapiro, A.G. (2002). Cone-specific mediation of rod system sensitivity. *Investigative Ophthalmology and Visual Sciences*, 43(1), 898-905.
- Shapiro, A.G., Beere, J.L., & Zaidi, Q. (2001). Time course of adaptation along the RG cardinal axis. *Color: research and application*, 26, 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*, 15(8), 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*, 13(12), 2319-2328.
- Shapiro, A.G., Pokorny, J., & Smith, V. (1996). Conditional variables of the scotopic threshold-versus-illuminance curve. *Color: research and application*, 21, 80-85.
- Ábráham, G., Körösi, H., Schanda, J., Shapiro, A.G., & Wenzel, K. (1995). Anomalies in additive color matches. *Color: research and application*, 20, 235-249.
- Shapiro, A.G., Pokorny, J., & Smith, V. (1994). Rods and the 10 color-matching functions. *Color: research and application*, 19, 236-245.
- Zaidi, Q. & Shapiro, A.G. (1993). Adaptive orthogonalization of opponent-color signals. *Biological Cybernetics*, 69(5/6), 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*, 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*, 10(8), 1785-1791.
- Greenstein, V., Shapiro, A.G., Zaidi, Q., & Hood, D. (1992). Sites of disease action in diabetics. *Investigative Ophthalmology & Visual Science*, 33, 2781-2790.
- Shapiro, A.G. & Zaidi, Q. (1992). The effects of prolonged temporal modulation on the differential response of color mechanisms. *Vision Research*, 32(11), 2065-2075. [http://dx.doi.org/10.1016/0042-6989\(92\)90068-T](http://dx.doi.org/10.1016/0042-6989(92)90068-T)
- Zaidi, Q., Shapiro, A.G., & Hood, D. (1992). The effect of adaptation on the differential sensitivity of the s-cone color system. *Vision Research*, 32(7), 1297-1318. [http://dx.doi.org/10.1016/0042-6989\(92\)90224-7](http://dx.doi.org/10.1016/0042-6989(92)90224-7)

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.), 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*, 19, pp. 231-232.

Invited presentations and public lectures (since 2008)

- Space, Color, and Rendering. (October 2016). Computer Science Department, University of Maryland, College Park, Maryland

Space and Color. (October 2016). Vision Group, Department of Psychology Johns Hopkins University, Baltimore Maryland

Invited presentations and public lectures (cont.)

- Multiple spatial systems for color vision. (September 2016). Seeing Colors Symposium, University of Regensburg, Germany.
- Baseball and perceptual limitations. (August 2016). Saber Seminar, Boston University.
- The Art and Science of Visual Illusions. (March 2015). Young Brain Scientists Program, Hong Kong University. <https://www.youtube.com/watch?v=UAFGcai9Ytk>
- Visual Illusions--Research at the Intersection of Art, Psychology, Neuroscience, Physics, Philosophy, Computer Science and Mathematics. (March 2015). Public lecture, Hong Kong University.
- Illusions generated by conflicts between color, color contrast, spatial scale and position. (March 2015). Tokyo Symposium on Optical Illusions, Meiji University.
- Why are we surprised by only some of the things we see? Implications of separating color from color contrast. (February 2015). Old Dominion University, Norfolk, VA.
- Why are we surprised by only some of the things we see? Implications of separating color from color contrast. (October, 2014). University of Virginia.
- Research-generated visual illusions designed to assess visual function. (September 2014). Clinical Section Grand Rounds, National Eye Institute, Bethesda, MD.
- Implications of separating colour and colour contrast: a model and related phenomena. (January 2013). The Colour Group U.K -- The Cambridge Research Systems Sponsored Lecture, London.
- The Art and Science of Visual Illusions. (September 2012). Center for Ideas and Society, University of California, Riverside.
- The Art and Science of Visual Illusions. (June 2011). Plenary Address, American Association of Mass Spectrometry, Denver, Colorado.
- The Art and Science of Visual Illusions. (April 2011). New York City Alumni of American University, Russian Tea Room, NY, NY.
- The Art and Science of Visual Illusions. (March 2011). Spring Emeriti Luncheon, American University, Washington, D.C.
- Implications of separating color from color contrast. (October 2010). Program in Neuroscience and Cognitive Science, University of Maryland, College Park.
- Visual Illusions: Research at the intersection of Neuroscience, Psychology, Physics, Computer Science, Art, and Philosophy. (April 2010). Public lecture and participation in seminar, Psychology Department and 1960 Scholars Program, Williams College, Williamstown, MA.
- The art and science of visual illusions. (February 2010). Board of Trustees, Provost's Office, American University, Washington, D.C.
- The art and science of visual illusions. (February 2010). Hillcrest Technologies, Rockville, MD.
- The implications of separate color and color contrast responses for the perception of relative brightness. (January 2010). Sensory Group Colloquium, National Institutes of Health, Bethesda, MD.
- The art and science of visual illusions. (December 2009). Public lecture and participation in final Honors seminar, Georgia Tech, Atlanta, GA.
- "Visual Illusions": Where the Brain, Psychology, Mathematics, Computer Science, Art, and Design all Come Together. (November 2009). Psychology Club, American University, Washington, D.C.
- Why are we surprised by only some of the things we see? Color, color contrast, and visual illusions. (November 2009). Biology Department colloquium, University of Maryland, Baltimore County, Baltimore, MD.
- Color is slow; color contrast is fast. (July 2009). Keynote Lecture, International Colour Vision Society Conference, Braga, Portugal.
- Spatial contrast, color contrast, and visual illusions. (April 2009). Department of Neuroscience colloquium, Pennsylvania State University, Hershey, PA.
- Separating color from color contrast: the implications for motion and brightness illusions. (February 2009). Colloquium, Centre for Visual Science, York University, Toronto, Canada.
- Why are we surprised by only some of the things we see? Spatial contrast, color contrast, and visual illusions. (May 2008). Colloquium, Florida Institute for Human and Machine Cognition, Pensacola, FL.
- Contrast, Color, and Neuroscience. (March 2008). Biology seminar (speaker selected by vote of Biology graduate students), Lehigh University, Allentown, PA.

Teaching

American University

Psychology as a Natural Science (taught as a large lecture and also as an honors seminar)

The Senses
Cognitive Neuroscience (taught as an undergraduate lecture and as a graduate seminar)

Teaching (cont.)

Computer Science Capstone
Computational Neuroscience
Distortions of Reality (taught as an honors seminar and as a first-year scholars seminar)
Visual neuroscience and visual illusions
Creativity and Innovation (an intensive core course for honors students, co-taught with colleagues in the Art department and the School of Communication)

University of Cambridge (during junior leave from Bucknell)

Provided supervision for the following courses:
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

Bucknell University

Perception
Perception Laboratory
Introduction to Neuroscience
Introduction to Psychology
Advanced Perception
Statistics
Advanced Statistics
Distortions of Reality (first-year seminar)

Lewis and Clark College

Introduction to Psychology
Cognition
Perception
Statistics
Advanced Statistics

Conference and Symposia Organizing

Chair and co-organizer, Optical Society of America's Fall Vision Meeting (to be held at AU, October 2017)
Chair and co-curator, Demo Night, Vision Sciences Society Annual Meeting (2009-2016)
Session chair, Lightness and Brightness session, Vision Sciences Society Annual Meeting (May 2007)
Member of 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).

Journal and Grant Reviewing

NIH Study Section, Mechanisms of Sensory, Perceptual and Cognitive Processes (ad hoc reviewer 2015, 2016)
Department of Veterans Affairs
National Science Foundation
Attention, Perception and Psychophysics (Consulting Editor, 2008-2014)
Color: Research and Application
Current Biology
Frontiers in Human Neuroscience

Human Factors
Journal of Imaging Science and Technology
Journal of Optical Society of America, A
Journal of Vision
Nature Neuroscience
Perception
PlosOne
Vision Research
Visual Neuroscience

Site Reviewer

University of Nevada, Reno, Psychology Department

Best Illusion of the Year contest

Remote Controls (2016), Shapiro, A. G.
 Star Wars Scroll Illusion (2015), Shapiro, A. G. & Flynn, O.
 Hybrid Motion and the Integration of Motion Elements (2014), Shapiro, A. G. & Flynn, O.
 Tusi or Not Tusi (2013), **Second prize**, Shapiro, A. G. & Rose-Henig A.
 Color Wagon Wheel (2012), **Third prize**, Shapiro, A. G., Kistler, W., & Rose-Henig A.
 Grouping by Contrast (2011), **Second prize**, Dixon, E., Shapiro, A. G., & Hamburger, K.
 The Exchange of Features, Textures and Faces (2011), Shapiro, A.G. & Caplovitz, G.
 Contest Judge (2010)
 The Break of the Curveball (2009), **First prize**, Shapiro, A.G., Lu, Z.L., Knight, E.J., & Ennis, R.
 Dramatically Different Percepts between Foveal & 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.
 Contest Judge (2006)
 Motion-Illusion Building Blocks (2005), **First prize**, Shapiro, A.G. & Charles, J.P.

Media Appearances

Illusions, CuriosityStream.org. Five-part series that I hosted and presented
Brain Games, National Geographic. Featured 7 of my illusions; I appeared in "Motion Commotion" episode
 News articles, interviews, and TV appearances, including NBC News (D.C. local stations), *New York Times*,
Washington Post, Fox News, *Wall Street Journal*, *Scientific American*, and CBC's *Quirks and Quarks* and *As It Happens*
 My illusions are frequently featured on international television shows, including Stephen Fry's *QI* and several Japanese television programs