KAREN L. GUNTHER, PH.D.

Wabash College, Department of Psychology,
301 W. Wabash Ave., Crawfordsville, IN 47933
e-mail: guntherk@wabash.edu phone: 765/361-6286

EDUCATION

Post-Doctoral Fellowship.
Medical College of Wisconsin (Milwaukee, WI)
March 2002 – June 2003 and July 2004 – July 2006
- Eye Institute
- Research Areas: Molecular Genetic and Psychophysical Study of Color Vision
- Advisors: Jay and Maureen Neitz

Cognitive Science Interdisciplinary PhD, 2002
University of California, San Diego (La Jolla, CA)
- Primary Specialization: Psychology
- Secondary Specialization: Neuroscience
- Dissertation Title: The Mechanisms Underlying Color Vision
- Advisor: Karen R. Dobkins

M.A. in Psychology, 1997
University of California, San Diego (La Jolla, CA)
- Thesis Title: Pitch Class Circle Orientation Alignment Between the Tritone and Semitone Paradoxes
- Advisor: Diana Deutsch

B.A. in Biopsychology, 1992
Oberlin College (Oberlin, OH)

TEACHING EXPERIENCE

Assistant Professor of Psychology. Wabash College (Crawfordsville, IN)
- July 2007 - present
- Undergraduate courses taught: Freshman Tutorial on Color, Introductory Psychology, Sensation and Perception, Research in Sensation and Perception, Cognitive Neuropsychology, Research Methods & Statistics, Literature Review, The Cognitive Neuroscience of Music, Senior Capstone, Cultures & Traditions

Visiting Assistant Professor of Psychology. St. Mary's College of Maryland (St. Mary's City, MD)
- August 2006 – June 2007
- Undergraduate courses taught: Sensation and Perception, The Cognitive Neuroscience of Music, Introductory Psychology

Visiting Assistant Professor of Neuroscience. Oberlin College
- July 2003 – June 2004
- Undergraduate courses taught: Color (an interdisciplinary course), Sensory Neuroscience, Sensory Psychophysics Lab, Introductory Neuroscience Lab
- Supervised research students.
- Performed independent research.

Adjunct Faculty. Psychology Department, Carroll College (Waukesha, WI)
- September 2002 – May 2003
- Undergraduate course taught: Introductory Psychology

Preparing Professional Faculty Certification. UC San Diego. February 2002

Instructor of Record. Psychology Department, UC San Diego
- August 1999, 2000, July 2001
- Undergraduate course taught: Introduction to Statistics

TEACHING EXPERIENCE (continued)

Adjunct Faculty. Behavioral Sciences Department, Palomar Community College (San Marcos, CA)
- Spring 2000
- Undergraduate course taught: Statistics

Coordinator. Cognitive Science Department, UC San Diego
- Fall 1999
- Graduate course taught: Color

Teaching Assistant. UC San Diego. September 1995 - December 2001
- Cognitive Psychology; Introduction to Statistics; Introduction to Psychology; Physiological Psychology; Drugs and Behavior; Introduction to Principles of Behavior; Theories of Personality; Abnormal Psychology; Psychology and the Arts.
- Presented occasional lectures, prepared and led discussion sections, wrote and graded exams, held office hours.

RESEARCH EXPERIENCE

- **Postdoctoral Research** (molecular genetics and visual psychophysics), The Medical College of Wisconsin, Eye Institute (March 2002 – June 2003 and July 2004 – July 2006).
- **Independent Faculty Research** (visual psychophysics), Oberlin College, Neuroscience Department, July 2003 – June 2004.
- **Graduate Research** (visual and auditory psychophysics), UC San Diego, Psychology Department, September 1995 - February 2002.
- **Research Assistant** (neuropharmacology and behavioral neuroscience), Abbott Laboratories (Abbott Park, IL), Pharmaceutical Products Division, September 1992 - July 1995.
- **Research Assistant**, The Ohio State University (Columbus, OH), Medical School, Department of Biochemistry. Summer 1992.
- **Research Assistant** (face recognition), Oberlin College, Psychology Department, February - May 1992.
- **Independent Project** (musical stroop), Oberlin College, Psychology Department, September 1991 - May 1992.
- **Summer Intern**, Syntex Pharmaceuticals (Palo Alto, CA), Institute of Pharmacology, Department of Neuroscience, Summer 1990.
- **Research Assistant**, Syntex Pharmaceuticals (Palo Alto, CA), Department of Immunology, January 1990.

GRANTS

- Great Lakes Colleges Association Pathways to Learning Collegium Study of Teaching and Learning Grant. 2009 - 2011. In this grant I examined how the use of biographies and autobiographies aids in student learning, memory, and enjoyment of a Sensation and Perception course. The books were supplemented with lectures on the concepts addressed in the books and with discussions of scientific articles related to the books. Sample books include *The Island of the Colorblind* (Oliver Sacks), *The Emperor of Scent* (Chandler Burr), and *Rebuilt: My Journey Back to the Hearing World* (Michael Chorost). A paper resulting from this project is currently under review at the *Journal of Undergraduate Neuroscience Education*.
- Ruth L. Kirschstein National Research Service Award (post-doctoral fellowship), National Institutes of Health, awarded for September 2004 – September 2006, received September 2004 – July 2006. F32 EY014789 *Genetic Loci Associated with L:M Cone Ratio Variation.* Although the eye contains three types of cone, long-wavelength-sensitive (L), medium-wavelength-sensitive (M), and short-wavelength-sensitive (S), the L and M cones comprise over 90% of our cones. In the fovea, the portion of the retina used for high acuity tasks such as reading, the L:M cone ratio varies tremendously, even among people with

GRANTS (continued)

normal color vision. The cause of this variability is presently unknown, however evidence suggests that it is inherent to the genetic mechanism that regulates expression of the L and M pigment genes, which reside on the X chromosome. I tested the hypothesis that DNA sequence polymorphisms at the X-chromosome visual pigment gene locus play a role in determining the L:M cone ratio. I sequenced regions of the L/M pigment gene array in DNA from subjects with known L:M cone ratios. Sequence differences were analyzed for correlation with cone ratio. Understanding how the L:M cone ratio is determined has important implications for understanding the neural circuitry for color vision.

- Fight for Sight Graduate Student Fellowship, 1998.
- Association for Research in Vision and Ophthalmology/National Eye Institute Fellowship Travel Grant, 1997.

AWARDS

- Independent Research Award, Oberlin College Psychology Department, 1992 - Musical Stroop Experiment.

PROFESSIONAL ACTIVITIES

- Council on Undergraduate Research, Psychology Division Councilor and Secretary, 2010-present
- Human Subjects/Institutional Review Board Committee, Wabash College
- Admissions Committee (2009-12, Chair 2010-11), Wabash College
- Lilly Steering Committee, Wabash College (an internal granting mechanism) 2008-09
- Coordinator of the Social Sciences Colloquium, Wabash College, 2008-present
- Editorial Board, Brain & Cognition
- Reviewer, Visual Neuroscience, 2005
- St. Mary's College of Maryland Neuroscience Award Committee. 2007
- Post-doctoral Advisory Council Member. The Medical College of Wisconsin. 2005 – 06.

INVITED TALKS

2011 Wally Bon Vivant: A Spicy Symposium on Food and the Liberal Arts, Wabash College, Crawfordsville, IN. The Physiology of Taste.

2010 mGluR's (Midwest/Great Lakes Undergraduate Neuroscience Research Symposium), Ohio Wesleyan University, Delaware, OH. Co-led a faculty teaching tips workshop with Neil Schmitzer-Torbert.

2010 Wabash College Ides of August Talk Series, The Use of "Non-Fiction" Novels in a Sensation & Perception Course.

2010 Sugar Creek Quilters, Crawfordsville, IN. Why are Colors Colored?

2009 Sugar Creek Quilters, Crawfordsville, IN. How I Became the Quilter I am.

2009 Learning & Memory/Cognitive Colloquium Series, Department of Psychological Sciences, Purdue University, West Lafayette, IN. How do We See Orange?

2009 Oxyopia Colloquium Series, School of Optometry, Indiana University, Bloomington. How do We See Orange?

2008 "Food" Freshman Tutorial, Wabash College. Lecture on "Taste".

2007 Psychology Department, Wabash College, Crawfordsville, IN. Color Vision: From Behavior to Genes

2007 Munsell Color Science Laboratory, Center for Imaging Science, Rochester Institute of Technology, Rochester, NY. Color Vision: From Behavior to Genes

2007 Psychology Department, Denison University, Granville, OH. Color Vision: From Behavior to Genes *and* Encoding Long Term Memory

INVITED TALKS (continued)

2006 Psychology Department, Washington College, Chestertown, MD. Color Vision with One, Two, and Three Cone Types

2006 Psychology Department, Scripps College, Claremont, CA. Color Vision: From Behavior to Genes *and* Encoding Long Term Memory

2006 Biology and Psychology Departments, St. Mary's College of Maryland, St. Mary's City, MD. Color Vision: From Behavior to Genes

2006 Psychology Department, Colgate University, Hamilton, NY. Color Vision: From Behavior to Genes

2006 Psychology Department, Drew University, Madison, NJ. Color Vision: From Behavior to Genes

2006 Psychology Department, Wesleyan University, Middletown, CT. Color Vision: From Behavior to Genes

2006 West Suburban Quilt Guild, Brookfield, WI. Why are Colors Colored?

2005 Basic Principles of Visual Biology, graduate level course. Cell Biology, Neurobiology, and Anatomy, The Medical College of Wisconsin.

2005 Vision Research Forum. Cell Biology, Neurobiology, and Anatomy, The Medical College of Wisconsin. Color Vision: From Behavior to Genes.

2004 Lakeshore Vision Conference, The Medical College of Wisconsin. Progress Report on the Search for the Genetic Loci of the L:M Cone Ratio.

2002 Lakeshore Vision Conference, The Medical College of Wisconsin. Preliminary Results in the Search for a Genetic Correlate of L:M Cone Ratio.

2002 Department of Ophthalmology and Visual Sciences, University of Chicago. Induceability of Luminance and Brightness.

2001 Department of Cell Biology, Neurobiology, and Anatomy, The Medical College of Wisconsin. Consequences of Asymmetries in the Relative Numbers of L versus M Cones.

2000 Interdisciplinary PhD Course, Cognitive Sciences Department, UC San Diego. Why are Colors Colored?

1998 Canyon Quilters of San Diego, San Diego, CA. Why are Colors Colored?

PROFESSIONAL ORGANIZATIONS

- Association for Psychological Science
- Council on Undergraduate Research
- International Colour Vision Society
- Inter-Society Color Council
- Optical Society of America
- Society for Neuroscience
- Faculty for Undergraduate Neuroscience
- Society for the Teaching of Psychology
- Vision Sciences Society

PUBLICATIONS

Gunther, K.L. The use of "non-fiction novels" in a sensation and perception course. Accepted for publication in the *Journal of Undergraduate Neuroscience Education*, pending "moderate revisions".

2008 **Gunther, K.L.**, Neitz, J., & Neitz, M. Nucleotide polymorphisms upstream of the X-chromosome opsin gene array tune L:M cone ratio. *Visual Neuroscience, 25*(3), 265 – 271.

PUBLICATIONS (continued)

2007 Baraas, R.C., Carroll, J., **Gunther, K.L.**, Chung, M., Williams, D.R., Foster, D.H., & Neitz, M. Adaptive-optics retinal imaging reveals S-cone dystrophy in tritan color vision deficiency. *Journal of the Optical Society of America A, 24*(5), 1438 - 1447.

2006 **Gunther, K.L**., Neitz, J., & Neitz, M. A novel mutation in the short-wavelength sensitive cone pigment gene associated with a tritan color vision defect. *Visual Neuroscience, 23*(3-4), 403 - 409.

2005 **Gunther, K.L.** & Dobkins, K.R. Induction effects for heterochromatic brightness matching, heterochromatic flicker photometry, and minimally distinct border: Implications for the neural mechanisms underlying induction. *Journal of the Optical Society of America A, 22*(10), 2182 - 2196.

2003 **Gunther, K.L.** & Dobkins, K.R. Independence of mechanisms tuned along cardinal and non-cardinal axes of color space: Evidence from factor analysis. *Vision Research, 43*, 683 – 696.

2002 **Gunther, K.L.** & Dobkins, K.R. Individual differences in chromatic (red/green) contrast sensitivity are constrained by the relative number of L- versus M-cones in the eye. *Vision Research, 42*(11), 1367 - 1378.

2000 Dobkins, K.R., **Gunther, K.L.**, Peterzell, D.H. What covariance mechanisms underlie green/red equiluminance, luminance contrast sensitivity, and chromatic (green/red) contrast sensitivity? *Vision Research, 40*, 613 - 628.

1999 Kowaluk, E.A., Kohlhaas, K.L., Bannon, A., **Gunther, K.**, Lynch, J.J. III, Jarvis, M.F. Characterization of the effects of adenosine kinase inhibitors on acute thermal nociception in mice. *Pharmacology, Biochemistry and Behavior, 63*(1), 83 - 91.

1998 Holladay, M.W., Bai, H., Li, Y., Lin, N.H., Daanen, J.F., Ryther, K.B., Wasicak, J.T., Kincaid, J.F., He, Y., Hettinger, A.M., Huang, P., Anderson, D.J., Bannon, A.W., Buckley, M.J., Campbell, J.E., Donnelly-Roberts, D.L., **Gunther, K.L.**, Kim, D.J., Kuntzweiler, T.A., Sullivan, J.P., Decker, M.W., & Arneric, S.P. Structure-activity studies related to ABT-594, a potent nonopioid analgesic agent: Effect of pyridine and azetidine ring substitutions on nicotinic acetylcholine receptor binding affinity and analgesic activity in mice. *Bioorganic and Medicinal Chemistry Letters, 8*(19), 2797 - 2802.

1997 Decker, M.W., Bannon, A.W., Curzon, P., **Gunther, K.L.**, Brioni, J.D., Holladay, M.W., Lin, N-H., Li, Y., Daanen, J.F., Buccafusco, J.J., Prendergast, M.A., Jackson, W.J., Arneric, S.P. ABT-089 [2-methyl-3-(2-(s)-pyrrolidinylmethoxy) pyridine dihydrochloride]: II. A novel cholinergic channel modulator with effects on cognitive performance in rats and monkeys. *Journal of Pharmacology and Experimental Therapeutics, 283*, 247 – 258.

1996 Dornan, W.A., McCampbell, A.R., Tinkler, G.P., Hickman, L.J., Bannon, A.W, Decker, M.W., & **Gunther, K.L.** Comparison of site-specific injections into the basal forebrain on water maze and radial arm maze performance in the male rat after immunolesioning with 192-IgG-saporin. *Behavioural Brain Research, 82*, 93 - 101.

1996 Bannon, A.W., Curzon, P., **Gunther, K.L.**, & Decker, M.W. Effects of intraseptal injection of 192-IgG-saporin in mature and aged Long-Evans rats. *Brain Research, 718,* 25-36.

1995 Bannon, A.W., **Gunther, K.L.**, & Decker, M.W. Is epibatidine really analgesic? Dissociation of the locomotor activity, temperature and analgesic effects of (±)-epibatidine. *Pharmacology, Biochemistry and Behavior, 51*, 693-698.

1995 Bannon, A.W., **Gunther, K.L.**, Decker, M.W., & Arneric, S.P. The influence of BayK8644 treatment on (±)-epibatidine-induced analgesia. *Brain Research, 678*, 244-250.

ABSTRACTS

2011 **Gunther, K.L.** & Dalhaus, R.N., III, & Red/Green Color Naming Declines in the Periphery. "Blue"/"Yellow" Does Not. What Happens in Visual Search? *Vision Sciences Society.*

2010 Dalhaus, R.N., III, & **Gunther, K.L.** Red/Green Color Naming Declines in the Periphery. "Blue"/"Yellow" Does Not. What Happens in Visual Search? *Optical Society of America Fall Vision Meeting.*

2010 Dalhaus, R.N., III, & **Gunther, K.L.** Red/Green Color Naming Declines in the Periphery. Blue/Yellow Does Not. What Happens in Visual Search? *mGluR's (Midwest/Great Lakes Undergraduate Neuroscience Research Symposium)*, Ohio Wesleyan University, Delaware, OH.

2007 Neitz, M., **Gunther, K.L.**, & Neitz, J. How nucleotide polymorphisms upstream of the X-chromosome opsin gene array tune L:M cone ratio. *International Colour Vision Society.*

2007 Baraas, R.C., Carroll, J., **Gunther, K.L.**, Chung, M., Williams, D.R., Foster, D.H., & Neitz, M. S-Cone dystrophy in tritan color-vision deficiency revealed by adaptive-optics retinal imaging. *Association for Research in Vision and Ophthalmology Abstr.* #3180.

2006 Baraas, R.C., Carroll, J., **Gunther, K.L.**, Chung, M., Chen, L., Williams, D.R., Neitz, M., & Foster, D.H. A progressive form of tritanopia revealed with adaptive-optics retinal imaging. *Engineering the Eye II.*

2006 **Gunther, K.L.**, Neitz, M., & Neitz, J. L:M cone contribution to heterochromatic flicker photometry. *Association for Research in Vision and Ophthalmology Abstr.* #3695.

2005 **Gunther, K.L.**, Neitz, J., & Neitz, M. A novel mutation in the short-wavelength sensitive cone pigment gene associated with a tritan colour vision defect. *International Colour Vision Society.*

2004 **Gunther, K.L.**, Bojar, J.A., Harrison, G.L.A., Shashidhar, V.M., Pawar, S.D., Neitz, J., Neitz, M. The role of relaxed natural selection against colorblindness in producing extreme variation in X-chromosome photopigment gene number and sequence among individuals with normal color vision. *Optical Society of America Fall Vision Meeting*, published in *Journal of Vision, 4*(11), 53a, http://journalofvision.org/4/11/53/ DOI 101167/4.11.53

2004 **Gunther, K.L.** & Dobkins, K.R. Both L+M and L-M mechanisms contribute to brightness induction. *Optical Society of America Fall Vision Meeting*, published in *Journal of Vision, 4*(8), 348a, http://journalofvision .org/4/8/348, DOI 10.1167/4.8.348

2003 **Gunther, K.L.**, Neitz, J., & Neitz, M. A novel missense mutation in the S cone photopigment in a male who made tritan errors on the Neitz Test of Color Vision. *Association for Research in Vision and Ophthalmology Abstr.* #1907.

2002 Dobkins, K.R. & **Gunther, K.L.** Chromatic contrast sensitivity is constrained by the relative number of L- vs. M-cones in the eye. *Optical Society of America Fall Vision Meeting*, published in *Journal of Vision, 2*(10), 53a, http://journalofvision.org/2/10/53, DOI 10.1167/2.10.53.

2000 **Gunther, K.L.** & Dobkins, K.R. Color contrast sensitivity: Independence of the cardinal axes and influence of L:M cone ratios as determined by factor analysis. *Association for Research in Vision and Ophthalmology Abstr.,* Vol. 41(4), 4289, p. S808.

ABSTRACTS (continued)

1998 **Gunther, K.L.**, Peterzell, D.H., & Dobkins, K.R. Are red/green isoluminance matches served by the same spatiotemporal *covariance* mechanisms that underlie chromatic and luminance contrast sensitivity? *Association for Research in Vision and Ophthalmology Abstr.,* Vol. 39(4), 4986, p. S1078.

1997 **Gunther, K.L.**, Peterzell, D.H., & Dobkins, K.R. What mechanisms underlie red/green isoluminance matches at various spatial and temporal frequencies? *Association for Research in Vision and Ophthalmology Abstr.,* Vol. 38(4), 4170, p. S892.

1996 Decker, M.W., Bannon, A.W., Curzon, P., **Gunther, K.L.**, Brioni, J.D., Holladay, M.W., Lin, N-H., Li, Y., Daanen, J., Buccafusco, J.J., Prendergast, M.A., Jackson, W.J., & Arneric, S.P. Effects of ABT-089, a novel cholinergic channel modulator, on cognitive performance in rats and monkeys. *Society for Neuroscience Abstr.,* Vol. 22, 502.10, p. 1263.

1996 Bannon, A.W., **Gunther, K.L.**, & Decker, M.W. Behavioral experience differentially alters the antinociceptive effect of morphine and (±)-epibatidine in mice. *Society for Neuroscience Abstr.,* Vol. 22, 541.6, p. 1366.

1995 **Gunther, K.L.**, Bannon, A.W., Decker, M.W., & Williams, M. Attenuation of (±)-epiabtidine's analgesic effect with acute caffeine or theophylline treatment. *Society for Neuroscience Abstr.*, Vol. 21(3), 247.11, p. 606.

1995 Decker, M.W., **Gunther, K.L.**, & Curzon, P. Effects of continuous infusion of (-)-nicotine on activity, acoustic startle, and spatial learning in septal-lesioned rats. *Society for Neuroscience Abstr.*, Vol. 21(1), 69.8, p. 159.

1995 Bannon, A.W., Curzon, P., **Gunther, K.L.**, & Decker, M.W. Injection of 192-IgG-saporin into the medial septal area exacerbates a spatial memory deficit in aged rats. *Society for Neuroscience Abstr.*, Vol. 21(3), 763.12, p. 1946.

1995 Kowaluk, E.A., Kohlhaas, K.L., **Gunther, K.L.**, Alexander, K.M., Daanen, J., Cowart, M., Wagenaar, F., & Kerwin, J.F., Jr. A-84643 selectively inhibits brain nitric oxide synthase. *FASEB* J. 9:A680.

1994 Bannon, A.W., **Gunther, K.L.**, & Decker, M.W. Further characterization of the in vivo effects of (±)-epibatidine, a potent nicotinic ligand. *Society for Neuroscience Abstr.*, Vol. 20 (2), 467.7, p. 1135.

VOLUNTEER WORK

• Oberlin College Class of 1992 Vice President
2006 – 2011

• Oberlin College Regional Alumni Coordinator
2005 – 2006. Milwaukee, WI
1996 – 2002. San Diego County, CA
1998 Regional Alumni Coordinator of the Year

• Oberlin College Alumni Recruiter
1994 – present

• Quilt Guild Board Member
2010 – 2011. President. Sugar Creek Quilters (Crawfordsville, IN)
2009 – 2010. Vice President. Sugar Creek Quilters (Crawfordsville, IN)
2005 – 2006. Secretary. Falls Quilters (Menomonee Falls, WI)
2002 – 2003. Secretary. West Suburban Quilters (Brookfield, WI)
1995 – 2001. Canyon Quilters (San Diego, CA): representative to the Southern California Council of Quilt Guilds (1998 – 2001), secretary (1999 – 2001), philanthropic committee (1996 – 1998)

VOLUNTEER WORK (continued)

• NPR Fund Drive Volunteer
2008 – present. WFYI (Indianapolis, IN)
2006 – 2007. WAMU (Washington, DC)
2003 – 2004. WKSU (Kent, OH)
1996 – 2002. KPBS (San Diego, CA)
1993 – 1995. WBEZ (Chicago, IL)

• Oberlin Senior's, Inc. (Oberlin, OH). 1990 – 1992. Four hours per week weaving and teaching others in the craft room, performing occasional concerts, and creating topics for and leading a weekly discussion group.