BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Blake, Robert Randolph	Centennial Professor of Psychology/ Professor of Ophthalmology & Vision Sciences
eRA COMMONS USER NAME (credential, e.g., agency login) rblake	

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of Texas, Arlington TX	B.A.	May 1967	Psychology
Vanderbilt University, Nashville TN	M.A.	May 1969	Expt. Psychology
Vanderbilt University, Nashville TN	Ph.D.	May 1972	Expt. Psychology
Baylor College of Medicine, Houston TX	NIMH Postdoc	1972-74	Neuroscience, Clinical Ophthamology

A. Personal Statement

My overarching research goal is to understand human visual perception, and to tackle this problem I use psychophysical techniques, human brain imaging and quantitative modeling. My work focuses largely on normal human adults, but I have collaborated with others in the study of vision in clinical populations including individuals with schizophrenia, autism and bipolar disorder. Over the years I have studied binocular vision, motion perception, perceptual organization, bistable perception, synesthesia and visual imagery. I am probably best known for my research on binocular fusion/rivalry and on perception of biological motion.

The wide array of problems being studied and techniques being employed provide a strong environment for trainees interested in acquiring the background, research skills and theoretical tools for pursuing research in the field of vision science. During my career I have supervised 45 doctoral and postdoctoral students, including a number who have assumed successful research careers at universities and health science centers. The vast majority of my scientific publications include predoctoral and/or postdoctoral students as co-authors. In terms of my research productivity, I have published 266 articles in refereed journals (including Science, Nature, PNAS), and those include widely cited papers appearing in Nature, Journal of Neuroscience and Neuron that have focused on neural mechanisms involved in perception of biological motion. My h-index currently stands at 67, and among my ten most frequently cited papers five deal with perception of biological motion.

B. Positions

1974-1977 - Assistant Professor of Psychology, Northwestern University
1977-1981 - Associate Professor of Psychology, Northwestern University
1981-1988 - Professor of Psychology and Neurobiology/Physiology, Northwestern University
1989-1999 - Professor of Psychology, Vanderbilt University
2000–present - Centennial Professor of Psychology, Vanderbilt University
2009–present - Professor of Ophthalmology and Vision Sciences

C. Honors

1977 Early Career Award, American Psychological Association
1978 Northwestern University Award for Excellence in Teaching
1978-1983 Career Development Award, National Institutes of Health
Elected 1987 Fellow, American Association for the Advancement of Science
Elected 1990 Fellow, American Psychological Society
1992, 2004 Fellow, Japan Society for Promotion of Science,
1995 William Evans Professorship, Otago University,
2000 Earl Sutherland Prize, Vanderbilt University,
2001 Wolfgang Kohler Memorial Lecture, Dartmouth College,
2002 Distinguished Alumni Award, University of Texas, Arlington

2002	Distinguished Faculty Award, Vanderbilt University
2004	Chancellor's Research Award, Vanderbilt University
Elected 2006	Fellow, American Academy of Arts & Sciences
2006	Helmholtz Lecture, Utrecht University
2006	Ig Nobel Prize Winnder, AIR/Harvard
2006	Vanderbilt University College of Arts & Science Graduate Mentoring Award
2007	Vanderbilt Department of Psychology Outstanding Alumni Award,
2008	Jefferson Award, Vanderbilt University
2009	University of Sydney International Visiting Research Fellow,
2010	Fellow, Association for Research in Vision & Ophthalmology,
2010	Foreign Scholar, World Class University Initiative, National Research Foundation, Korea
Elected 2012	Elected member, National Academy of Sciences

D. Representative publications relevant to proposal (16 selected from 266 peer reviewed articles)

1. Ahlstrom, V., Blake, R. & Ahlstrom, U. (1997) Perception of biological motion. *Perception,* 26, 1539-1548. PMID: 9616481
2. Grossman, E.D. & Blake, R. (1999) Perception of coherent motion, biological motion and form-from-motion under dim-light conditions. *Vision Research*, 39, 3721-3727. PMID:10746142
3. Grossman E, Donnelly M, Price R, Morgan V, Pickens D, Neighbor G & Blake R (2000) Brain areas involved in perception of biological motion. *Journal of Cognitive Neuroscience*, 12, 711-720. PMID:11054914
4. Grossman, E. & Blake, R. (2001) Brain activity evoked by inverted and imagined biological motion. *Vision Research*, 41, 1475-1482. PMID:11322987
5. Tadin, D., Lappin, J.S., Blake, R. & Grossman, E. (2002) What constitutes an efficient reference frame for vision? *Nature Neuroscience*, 5, 1010-1015. PMID:12219092
6. Grossman, E. & Blake, R. (2002) Brain areas active during visual perception of biological motion. *Neuron,* 35,1167-1176. [Reprinted in Social Neuroscience (J.T. Cacioppo & G. Berntson, Eds) Psychology Press, 2005] PMID:12354405
7. Blake, R., Turner, L.M., Smoski, M.J., Pozdol, S.L. & Stone, W.L. (2003) Visual recognition of biological motion is impaired in children with autism. *Psychological Science*, 14, 151-157. PMID:12661677
8. Grossman, E., Blake, R. & Kim, C.-Y. (2004) Learning to see biological motion: brain activity parallels behavior. *Journal of Cognitive Neuroscience*, 16, 1669-1679. PMID: 15601527
9. Ikeda, H., Blake, R. & Watanabe, K. (2005) Eccentric perception of biological motion is unscalably poor. *Vision Research*.45, 1935-1943.Wilson, H.R., Blake, R. & Lee, S.H. (2001) Dynmics of traveling waves in visual percepion. *Nature,* 412, 907-910. PMID:11528478
10. Blake, R. & Shiffrar, M. (2007) Perception of human motion. *Annual Review of Psychology*, 58, 47-73. PMID:16903802.
11. Gold, J.M., Tadin, D., Cook, S.C. & Blake, R. 2008) The efficiency of biological motion perception. *Perception & Psychophysics,* 70, 88-95. PMID: 18306963
12. Kim, J., Blake, R., Park, S., Shin, Y.-W., Kang, E.-H. & Kwon, J.-S. (2008) Selective impairment in visual perception of biological motion in obsessive-compulsive disorder. *Depression and Anxiety*, 25, E15-25. PMID:17994588
13. Jackson, S. & Blake, R. (2010) Neural integration of information specifying human structure from form, motion and depth. *Journal of Neuroscience*, 30, 838-848.
14. Kim, J., Park, S. & Blake, R. (2011) Perception of biological motion in schizophrenia and healthy individuals: a behavioral and fMRI study. *PLoS One*, 6(5): e19971. doi:10.1371/journal.pone.0019971.
15. Pica, P., Jackson, S., Blake, R. & Troje, N. (2011) Comparing biological motion perception in two distinct human societies. PLoS One, 6(12):e28391.
16. Jung, E., Zadbood, A., Lee, S.H., Tomarken, A. & Blake, R. (2013) Individual differences in the perception of biological motion and fragmented figures are not correlated. *Frontiers in Perception*, 4, 569.1-12. http://www.frontiersin.org/Journal/10.3389/fpsyg.2013.00795/full

E. Research Support

Current

R21-EY022752 Blake (PI) 08/2013-present

Relation of GABA levels in visual cortex to strength of interocular suppression

This project tests the prediction that individual differences in the strength of interocular suppression can be identified and linked to individual differences in levels of the inhibitory neurotransmitter GABA. A key strength is our use of several analytic approaches including structural equation modeling (SEM) to assess whether the pattern of covariation among different measures of binocular rivalry demonstrate the necessary psychometric features to indicate the existence of individual differences in a higher-order construct of depth of suppression. We can then assess the degree to which individual differences in GABA levels are related both to this construct and specific tasks. Results from this project could open the door for studies of individual differences in phasic changes in GABA levels consequent to experimental manipulations including visual adaptation and perceptual learning.

Centennial Research Fund Blake (PI) 09/01/00-present

Vanderbilt University

Binocular rivalry outside of attention

This project, currently active, involves development of a novel method permitting us to assess the consequence of withdrawl of attention from stimuli engaged in binocular rivalry. Exploiting binocular rivalry's temporal characteristics in a manner not conceived before, we are finding direct, perceptual evidence that binocular rivalry requires attention and breaks down without it. Apart from requiring a revision of virtually all quantitative models of binocular rivalry, which do not incorporate attention as a factor, the finding implies that directed attention is necessary in allowing sensory input to even engage in the neural competition that culminates in conscious perception, a suggestion of utmost importance for understanding the hotly debated relation between attention and consciousness.

R32-10142 San-Hun Lee (PI) 03/01/2010-06/30/2014

National Research Foundation of Korea funded by the Ministry of Education, Science and Technology

Human Visual Perception

I am a funded investigator on this core grant awarded to Seoul National University under the auspices of the World Class University Initiative. The research supported by this source centers around perception of biological motion and the its underlying neural concomitants. We are currently using pattern classification techniques to investigate the specificity of neural responses within targeted areas of the human brain activated when people view biological motion animations.

Recently Completed

R01EY013358 Blake (PI) 04/01/2001-02/28/2012

NIH/NEI

Binocular rivalry in human vision

This project has focused on three aspects of binocular rivalry: a) determinants of initial dominance in rivalry (*selection*), with particular emphasis on affective and attentional factors, b) role of neural adaptation in governing the dynamics of rivalry, a motivated by recent computational models of rivalry (*dynamics*), c) the residual effectiveness of a suppressed stimulus as revealed by visual adaptation aftereffects.

R01EY016752 Heeger (PI) 07/01/05 –06/30/08

NIH/NEI

Traveling waves in visual cortex during binocular rivalry

This project used a combination of complementary methods (psychophysics and functional magnetic resonance imaging in humans; optical imaging, electrophysiology, and microstimulation in monkeys) to measure and characterize neural processes underlying perceptual traveling waves during binocular rivalry. Among the research advances achieved in this project was the development of the periodic perturbation technique to be used as one of the tasks in the proposed project.

R03EY014437 Blake (PI) 08/01/2003-07/31/2008

NIH/NEI
Effective connectivity in brain imaging vision
This project, supported by the Small Grants for Pilot Research program, allowed the PI to develop, refine and validate analytic techniques for inferring the relative contributions of feed forward and feedback contributions to fMRI activations in multiple visual areas. The project was instrumental in expanding the PI's technical skills in fMRI, and it led to publication of multiple brain imaging studies by the PI's lab.

R01EY07760 Blake (PI) 09/01/1988–11/30/2007
NIH/NEI
Mechanisms of perceptual organization in human vision
The overarching goal of this project was to study the role of temporal factors in perceptual organization. The topic is unrelated to the current proposal, but several of the MatLab routines (e.g., dynamic grey-scale animation displays) developed under the auspices of this grant are now used in our work on binocular rivalry.