

BIOGRAPHICAL SKETCH

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NAME Mark T. Wallace	POSITION TITLE Associate Professor		
eRA COMMONS USER NAME MWALLACE1			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Temple University, Philadelphia, PA	B.A.	1985	Biology
Temple University, Philadelphia, PA	M.A.	1987	Biology
Temple University, Philadelphia, PA	Ph.D.	1990	Neurobiology

A. Positions and Honors:**Positions:**

- 1990-1993 Postdoctoral Fellow (NIH NRSA), Dept of Physiology, Medical College of VA, Richmond, VA
 1993-1994 Assistant Professor, Dept of Physiology, Medical College of Virginia, Richmond, VA
 1994-2002 Assistant Professor, Dept. Neurobiology & Anatomy; Wake Forest University School of Medicine; Winston-Salem, NC 27157
 2002-2005 Associate Professor, Dept. Neurobiology & Anatomy; Wake Forest University School of Medicine; Winston-Salem, NC 27157
 2006-present Associate Professor, Dept. Hearing and Speech Sciences; Vanderbilt University School of Medicine
 2006-present Associate Professor, Department of Psychology; Vanderbilt University

Awards:

- 1995-1997 Fellow, Winter Conference on Brain Research
 1997 Fellow, European Brain Research Organization
 2003 Faculty Excellence Award, Wake Forest University

B. Selected peer-reviewed publications

- Meredith, M.A., M.T. Wallace and B.E. Stein (1992) Visual, auditory and somatosensory convergence in output neurons of the cat superior colliculus: multisensory properties of the tecto-reticulo-spinal projection. *Exp. Brain Res.* 88:181-186.
 Wallace, M.T., M.A. Meredith and B.E. Stein (1992) Integration of multiple sensory modalities in cat cortex. *Exp. Brain Res.* 91:484-488.
 Wallace, M.T., M.A. Meredith and B.E. Stein (1993) Visual, auditory and somatosensory cortices converge on output neurons of the superior colliculus. *J. Neurophysiol.* 69: 1797-1809.
 Wallace, M.T. and B.E. Stein (1994) Cross-modal synthesis in the midbrain depends on input from cortex. *J. Neurophysiol.* 71: 429-432.
 Wallace, M.T., LK Wilkinson and B.E. Stein (1996) Representation and integration of multiple sensory inputs in primate superior colliculus. *J. Neurophysiol.* 76:1246-1266
 Wallace, M.T. and B.E. Stein (1996) Sensory organization of the superior colliculus in cat and monkey. *Prog. Brain Res.*, 112:301-311.
 Stein, B.E. and M.T. Wallace (1996) Comparisons of cross-modality integration in midbrain and cortex. *Prog. Brain Res.*, 112:289-299.
 Wallace, M.T. and B.E. Stein (1997) Development of multisensory neurons and multisensory integration in cat superior colliculus. *J. Neurosci.*, 17:2429-2444.
 Wallace, M.T., J.G. McHaffie and B.E. Stein (1997) Visual response properties and visuotopic representation in the newborn monkey superior colliculus. *J. Neurophysiol.* 78:2732-2741.

- Kadunce, D.C., Vaughan, J.W., Wallace, M.T., Benedek, G., and Stein, B.E. (1997) Mechanisms of within-modality and cross-modality suppression in the superior colliculus. *J. Neurophysiol.* 78:2834-2847.
- Wallace, MT, Meredith, MA and Stein, BE (1998) Multisensory integration in the superior colliculus of the alert cat. *J. Neurophysiol.* 80:1006-1010.
- Wallace, M.T. and B.E. Stein (2000) The onset of cross-modal synthesis in the neonatal superior colliculus is gated by the development of cortical influences. *J. Neurophysiol.* 83:3578-3582.
- Wallace, M.T and B.E. Stein (2001) Sensory and multisensory responses in the newborn monkey superior colliculus. *J. Neurosci.* 21:8886-8894.
- Jiang W, MT Wallace, H Jiang, JW Vaughan, and BE Stein (2001) Two cortical areas mediate multisensory integration in superior colliculus neurons. *J. Neurophysiol.* 85: 506-522.
- Kadunce DC, Vaughan JW, Wallace MT, and Stein BE (2001) The influence of visual and auditory receptive field organization on multisensory integration in the superior colliculus. *Exp. Brain Res.* 139: 303-310.
- Laurienti PJ, Burdette JH, Wallace MT, Yen Y-F, Field AS, and Stein BE (2002) Activity in visual and auditory cortex can be modulated by influences from multiple senses. *J. Cognitive Neurosci.* 14(3): 420-429, 2002.
- Hairston D, Wallace MT, Vaughan JW, Stein BE, Norris JL, and Schirillo JA (2003) Visual localization ability influences cross-modal bias. *J. Cognitive Neurosci.* 15:20-29..
- Laurienti PJ, Wallace MT, Maldjian JA, Susi CM, Stein BE, and Burdette JH (2003) Cross-modal sensory processing in the anterior cingulate and medial prefrontal cortices. *Human Brain Mapping.* 19: 213-223.
- Lovelace CT, Stein BE and Wallace MT (2003) An irrelevant light enhances auditory detection in humans: A psychophysical analysis of multisensory integration in stimulus detection. *Cogn. Brain Res.* 17: 447-453.
- Wallace MT (2003) Cross-Modal Neural Development. In: "Connectionist Models of Development," P. Quinlan (ed.) Psychology Press. pp.311-343.
- Hairston WD, Laurienti PJ, Mishra G, Burdette JH and Wallace MT (2003) Multisensory enhancement of localization under conditions of induced myopia. *Exp. Brain Res.* 152: 404-408.
- Perrault TJ, Vaughan JW, Stein BE and Wallace MT (2003) Neuron-specific characteristics predict the magnitude of multisensory integration. *J. Neurophysiol.* 90: 4022-4026.
- Wallace MT, Roberson G, Hairston WD, Stein BE and Schirillo JA (2004) Unifying multisensory signals across time and space. *Exp. Brain Res.* 158: 252-258.
- Burnett LB, Stein BE, Chaponis D and Wallace MT (2004) Superior colliculus lesions preferentially disrupt multisensory orientation. *Neuroscience* 124: 535-547
- Wallace MT (2004) The Development of Multisensory Integration. In: The Handbook of Multisensory Integration, G. Calvert et. al. (eds.) MIT Press. pp. 625-642.
- Wallace MT, Ramachandran R and Stein BE (2004) A revised view of sensory cortical parcellation. *Proc. Natl. Acad. Sci. USA* 101: 2167-2172.
- Wallace MT (2004) The development of multisensory processes. *Cogn. Processing* 5: 69-83.
- Wallace MT, Perrault TP, Hairston WD, and Stein BE (2004) Visual experience is necessary for the development of multisensory integration. *J. Neurosci.* 24: 9580-9584.
- Perrault TP, Vaughan JW, Stein BE, and Wallace MT (2005) Superior colliculus neurons use distinct operational modes in the integration of multisensory stimuli. *J. Neurophysiol.* 93: 2575-2586.
- Laurienti P, Perrault T Jr, Stanford TR, Wallace MT, and Stein BE (2005) On the use of superadditivity as a metric for characterizing multisensory integration in functional neuroimaging studies. *Exp. Brain Res.* 166: 289-297.
- Hairston WD, Burdette JH, Flowers DL, Wood FB, and Wallace MT (2005) Altered temporal profile of visual-auditory multisensory interactions in dyslexia. *Exp. Brain Res.* 166: 474-480.
- Laurienti PJ, Burdette JH, Maldjian JA, and Wallace MT (2006) Enhanced multisensory integration in older adults. *Neurobiol. Aging* 27:1155-1162.
- Hairston WD, Hodges DA, Burdette JH, Wallace MT (2006) Auditory enhancement of visual temporal order judgment. *Neuroreport* 17:791-795.
- Wallace MT, Stein BE (2006) Early experience determines how the senses will interact. *J. Neurophysiol.* (In Press)
- Burnett LR, Stein BE, Perrault TJ, Wallace MT (2006) Excitotoxic lesions of the superior colliculus preferentially impact multisensory neurons and multisensory integration. *Exp Brain Res.* (In Press)
- Wallace MT, Carriere BN, Perrault TJ, Vaughan JW, Stein BE (2006) The development of cortical multisensory integration. *J. Neurosci.* (In Press)

C. Research Support.

Wallace, Mark T.

Research Projects Ongoing:

Development of Multisensory Cortex: Role of Experience

P.I.: Mark T. Wallace

Agency: National Institute of Mental Health

Type: RO1 (MH63861)

Period: 07/01/02 - 06/30/07

The objective of this research project is to document to normal development of multisensory processing in cortex, as well as to examine how experience shapes such development. This work represents a fundamental step in gaining a better mechanistic understanding of how our perceptions of the world are created at the neural level.

A Multisensory Framework for Developmental Dyslexia

P.I.: Mark T. Wallace

Agency: National Institute of Child Health and Development

Type: RO3 (HD050860)

Period: 07/01/05 – 06/30/07

The major goals of this project are to establish the nature of the pre-linguistic multisensory processing deficits associated with developmental dyslexia, as well as to gather preliminary data as to the brain networks that might subserve these differences.