

# JOHANNES BURGE

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Education: PhD, Vision Science, *University of California, Berkeley* 2002-2008  
BA, Psychology *Stanford University* 1996-2000  
Minor, Mathematics *Stanford University*

Research: Bayesian ideal observer theory, Natural scene statistics, Computational modeling,  
Interests Visual psychophysics, Physiological optics, Figure-ground cues, Defocus estimation, Disparity estimation, Depth perception, Cue-combination, Cue-calibration, Technological applications

Research: Geisler Lab, Center for Perceptual Systems, *UT Austin, Austin, TX*, 2009-now  
Experience Banks Lab, Vision Science Program, *UC Berkeley, Berkeley, CA*, 2002-2009  
Ernst Lab, MPI for Biological Cybernetics, *Tübingen, Germany*, 2003-2004  
Marcus Infant Cognition Lab, *New York University, New York, NY*, 2000-2001  
Psychophysiology Research Lab, *NASA Ames, Moffit Field, CA*, 1999-2000

Professional: Reviewer, *Journal of Neuroscience*  
Service Reviewer, *Journal of Vision*  
Reviewer, *Journal of Neurophysiology*  
Reviewer, *PLoS Computational Biology*  
Reviewer, *Frontiers in Perception Science*  
Reviewer, *Frontiers in Psychology*  
Reviewer, *Investigative Ophthalmology and Visual Science*  
Reviewer, *Transactions on Haptics*

Patents: Burge J, Geisler WS. "An optimal imaged-based method for estimating defocus in individual natural or artificial images". Provisional Patent 22084-P069V1.

Publications: Burge J, Geisler WS (in press). "Optimal defocus estimation in individual natural images". *Proceedings of the National Academy of Sciences*.

Banks MS, Burge J, & Held R (2011). "The statistical relationship between depth, visual cues, and human perception". In: *Sensory Cue Integration*. Ed: Landy, M. Oxford University Press.

Burge J, Geisler WS (2011). "Optimal image-based defocus estimates from individual natural images". *Proceedings of the Optical Society of America: Imaging Systems and Applications*, July: Toronto, Canada.

Cooper E, Burge J, Banks MS (2011). "The vertical horopter is not adaptable but it may be adaptive". *Journal of Vision*, 11(3) 20: 1-19.

Burge J, Fowlkes CC, Banks MS (2010). "Natural scene statistics predict how the figure-ground cue of convexity affects human depth perception". *Journal of Neuroscience*, 30(21): 7269-7280.

Burge J, Girshick AR, Banks MS (2010). "Visual-haptic adaptation is determined by relative reliability". *Journal of Neuroscience*, 30(22): 7714-7721.

Burge J, Ernst MO, Banks MS (2008). "The statistical determinants of adaptation rate in human reaching". *Journal of Vision*, 8(4) 20: 1-19.

Burge J, Peterson MA, & Palmer SE (2005). "Ordinal configural cues combine with metric disparity in depth perception." *Journal of Vision*, 5(6), 534-542.

Gepshtein S, Burge J, Ernst MO, & Banks MS (2005). "The combination of vision and touch depends on spatial proximity." *Journal of Vision*, 5(11), 1013-1023.

Cowings PS, Toscano WB, Keller MA, Burge J "Autogenic-feedback training exercise improves pilot performance: enhanced functioning under search and rescue flying conditions," *The International Journal of Aviation Psychology*. 11(3), 305- 315.

**Manuscripts:** Burge J, Geisler WS (in preparation). "Optimal disparity estimation in natural In Preparation stereo-images".

Burge J, Gori M, Banks MS (in preparation). "Adapting the figure-ground cue of convexity for depth perception".

Girshick AR, Burge J, Fowlkes CC, Banks MS (in preparation). "Biases in slant perception: prior expectations and natural scene geometry".

**Awards:** American Optometric Foundation (AOF) William C. Ezell Fellowship, 2006

Outstanding abstract scholarship. Computational workshop: Bridging the gap between sensation and motor control. Karlsruhe, Germany, 2006

National Institute of Health (NIH) Training Grant recipient, 2002-2004

**Invited:  
Talks** OSA: Imaging Systems & Applications, Toronto, CA July 2011  
Vision Sciences Society. Naples, Florida. May 2011  
Population Biology Seminar Series, UT Austin May 2011  
Redwood Center for Theoretical Neuroscience, UC Berkeley Sept 2010  
Vision Sciences Society. Naples, Florida. May 2010  
Italian Institute of Technology. Genoa, Italy March 2010  
COSYNE. Salt Lake City, Utah. March 2010  
Vision Sciences Society. Naples, Florida. May 2008  
European Conference on Visual Perception. Arezzo, Italy August 2007  
European Conference on Visual Perception. La Coruna, Spain August 2005  
MPI for Biological Cybernetics, Tubingen, Germany July 2005  
Vision Sciences Society. Sarasota, Florida May 2004

**Conference:  
Abstracts** Burge J, Geisler WS (2011). "Optimal receptive fields for disparity estimation in natural images". *Society for Neuroscience*, Washington, D.C.

Sebastian S, Burge J, Geisler WS (2011). "Human discrimination of defocus blur in natural images". *Society for Neuroscience*, Washington, D.C.

Burge J, Geisler WS (2011) "Optimal image-based defocus estimates from individual natural images". *Optical Society of America: Imaging Systems and Applications*. Toronto, Canada. (TALK)

Burge J, Geisler WS (2011) "Optimal disparity estimation in natural stereo-

images". *Vision Sciences Society*, Naples, Florida (TALK)

Burge J, Geisler WS (2010) "Optimal defocus detection and estimation in natural images". *Vision Sciences Society*, Naples, Florida (TALK)

Burge J, Geisler WS (2010) "Detection and estimation of defocus in natural images". *COSYNE*, Salt Lake City, Utah (TALK)

Burge, J, Held R, Banks MS (2008) "Blur and accommodation are metric depth cues." *Vision Sciences Society*, Sarasota, Florida (TALK)

Girshick AR, Burge J, Banks MS (2008). "Prior expectations in slant perception: has the visual system internalized natural scene geometry". *Vision Sciences Society*, Sarasota, Florida (TALK)

Burge J, Fowlkes, CC, Banks, MS (2007) "Configural cues, disparity, and depth perception: the internalization of natural scene statistics". *European Conference on Visual Perception*, A Coruna, Spain (TALK)

Burge J, Girshick AR, Banks MS (2007) "Visuo-haptic adaptation: the role of relative reliability" *Vision Science Society*, Sarasota, Florida

Burge J, Ernst MO, Banks MS (2006) "Modeling visuo-motor adaptation behavior with a Kalman Filter" *Computational workshop: bridging the gap between sensation and perception*, Karlsruhe, Germany

Burge J, Peterson MA, Palmer SE, & Banks MS (2005) "Configural cues combine with disparity in depth perception", *European Conference on Visual Perception* (TALK)

Ernst MO, Burge, J, Banks, MS (2005). "Using a Kalman Filter to predict visuomotor adaptation behavior". *European Conference on Visual Perception*

Banks, MS, Burge, J, & Schlerf, JE (2005). "Disparity and texture gradients are combined in a weighted sum and a subtraction" *European Conference on Visual Perception*

Ernst, MO, Burge, J, Banks, MS (2005). "Resolving visual-tactual incongruity depends on sensory reliability". *International Multisensory Research Forum*, Dublin, Ireland

Burge, J, Ernst, MO, Banks, MS (2005). "Localization, not perturbation, affects visuomotor recalibration." *Vision Sciences Society*

Banks, MS, Burge, J, & Schlerf, JE (2005). "Disparity and texture gradients are combined in a slant estimate and a homogeneity estimate", *Vision Sciences Society*, (TALK)

Burge, J, Peterson, MA, & Palmer, SE (2004) "Perceived depth is influenced by binocular disparity and configural cues", *Vision Sciences Society* (TALK)

Gepshtein, S, Burge, J, Banks, MS, & Ernst, MO (2004) "What is an inter-sensory object? Optimal combination of vision and touch depends on their spatial coincidence," *Vision Sciences Society*

Burge, J, Hillis, JM., Landy, MS, & Banks, MS (2003) "Disparity and texture

gradients are combined in two ways." *Vision Sciences Society*

Teaching:	Full-day workshop on natural scene statistics and statistical methods	July 2011	
Experience	Perception and Psychophysics,	UC Berkeley.	Fall 2003
	Perception and Psychophysics,	UC Berkeley.	Fall 2002