

# **Thomas Andrew Busey**

**Vita, January 2010**

## **BIOGRAPHICAL DATA**

Address: Department of Psychology  
Indiana University  
Bloomington, IN 47405  
(812) 855-4261  
(812) 855-4691 (fax)

email: busey@indiana.edu  
web page with PDFs: [www.indiana.edu/~busey](http://www.indiana.edu/~busey)

Birth Year: 1966

## **EDUCATION**

B.A.: Cornell University, Psychology, 1988 (Adviser: James Cutting)  
Ph.D.: University of Washington, Experimental Psychology, 1994  
(Adviser: Geoffrey R. Loftus)

## **PROFESSIONAL EMPLOYMENT**

Professor, Indiana University, 2007-present  
Associate Professor, Indiana University, 2000-2007  
Assistant Professor, Indiana University, 1994-1999  
Instructor, University of Washington, 1994  
Research Assistant for Geoffrey Loftus, 1989-1992

## **AWARDS AND HONORS**

### **Fellowships**

National Institute of Mental Health Predoctoral Fellowship, 1992-1994. \$23,600

## **EDITORIAL WORK**

Associate Editor, *Psychonomic Bulletin & Review*, 2007-2010  
Editorial Board, *Psychonomic Bulletin & Review*, 2006-2007

## **GRANT SUPPORT**

### **Primary Investigator**

Spatial Media, Inc. Stereoscopic depth cues in memory. 1995-2000. \$43,000.  
NIH R03 Grant, Face Recognition and Memory. 1999-2001, \$35,000.

National Institutes of Justice. Adding human expertise to the quantitative analysis of fingerprint examiners. Busey is PI, Chen Yu is Co-PI. Grant #2005-MU-BX-K076. 12/2005-12/2009. \$430,000.

National Institutes of Justice. The information content of friction ridge impressions as revealed by human experts. Busey is PI, Chen Yu is Co-PI. Grant #2009-DN-BX-K226. 10/2009-9/2012. \$423,000.

### CoPI Grants (with separate budget lines)

NIH/NIA Aging and temporal processing: A multi-modality study. 5/1/05-4/30/10 \$2,460,364. Larry Humes is PI, Tom Busey and Jim Craig are Co-PI's with yearly budgets of about \$150,000 direct.

NSF-DUE grant to support the development of software for Cognitive Science 2002-2007, \$150,000. Subcontract with The Mind Project, Illinois State University, David Anderson, PI.

Darpa: Exceptional Sensory-Perceptual Abilities: Identifying Persons with Superior Ability to Learn Auditory, Visual and Tactile Identification and Classification Tasks. 2003-2007. Co-PI with Charles Watson. ~\$300,000

### Other Grants

Investigator on NIH R01 Grant to Brian O'Donnell, Visual Processing in Schizophrenia and SPD. 2001-2004. ~\$500,000.

Investigator on NIH R01 Grant to Brian O'Donnell, Visual Processing in Schizophrenia and SPD. 2005-2010. ~\$500,000.

## PUBLICATIONS

### Journal Articles

Busey, T.A., Brady, N.P. & Cutting, J.E. (1990). Compensation is unnecessary for the perception of faces in slanted pictures. *Perception & Psychophysics*, 48, 1-11.

Busey, T.A. (1992). Tachistoscopic software for Macintosh computers. *Behavior Research Methods, Instruments, & Computers*, 24, 426-430.

Loftus, G.R. & Busey, T.A. (1992). Multidimensional models and iconic decay. *Journal of Experimental Psychology: Human Perception and Performance*, 18, 556-561.

Loftus, G.R., Busey, T.A. & Senders, J. (1993). Providing a sensory basis for models of visual information acquisition. *Perception & Psychophysics*, 54, 535-554.

Busey, T.A. & Loftus, G.R. (1994). Sensory and cognitive components of visual information acquisition. *Psychological Review*, 101, 446-469.

Busey, T.A. & Loftus, G.R. (1998). Binocular information acquisition and visual memory. *Journal of Experimental Psychology: Human Perception and Performance*, 24, 4, 1188-1214.

- Busey, T. (1998). Physical and psychological representations of faces: Evidence from morphing. *Psychological Science*, *9*, 476-482.
- Busey, T.A. (1998). Temporal inhibition in character identification. *Perception and Psychophysics*, *60*, 285-304.
- Busey, T. (1999). Localization and identification rely on different temporal frequencies. *Vision Research*, *39*, 513-532.
- Busey, T. A & Tunnicliff, J. (1999). Accounts of blending, typicality and distinctiveness in face recognition. *Journal of Experimental Psychology: Learning Memory and Cognition*, *25*, 1210-1235.
- Busey, T. A., Tunnicliff, J., Loftus, G. R., & Loftus, E. (2000). Accounts of the confidence-accuracy relation in recognition memory. *Psychonomic Bulletin & Review*, *7*, 26-48.
- Busey, T.A. & Townsend, J. (2001). Independent sampling vs. inter-item dependencies in whole report processing: Contributions of processing architecture and variable attention. *Journal of Mathematical Psychology*, *45*, 283-323.
- Schuh, K. L. & Busey, T. A. (2001). Implementation of a problem-based approach in an undergraduate cognitive neuroscience course. *College Teaching*, *49*, 153-159.
- Craig, J. C. & Busey, T. A. (2003). The effect of motion on tactile and visual temporal order judgments. *Perception & Psychophysics*, *65*, 81-94.
- Wild, H. A., & Busey, T.A. (2004). Seeing faces in the noise: Stochastic activity in perceptual regions of the brain may influence the perception of ambiguous stimuli. *Psychonomic Bulletin and Review*, *11* (3), 475-481.
- Busey, T. A. & Zaki, S. (2004). The contribution of symmetry and motion to the recognition of faces at novel orientations. *Memory and Cognition*, *32* (6), 916-931.
- Busey, T. A. & Vanderkolk, J. R. (2005). Behavioral and electrophysiological evidence for configural processing in fingerprint experts. *Vision Research*, *45*, 431-448.
- Krishnan, G. P., Skosnik, P. D., Vohs, J. L., Busey, T. A., & O'Donnell, B. F. (2005). Relationship between steady-state and induced gamma activity to motion. *Neuroreport: For Rapid Communication of Neuroscience Research*, *16*, 625-630.
- Jeffery, L., Rhodes, G., & Busey, T. (2006). View-specific coding of face shape. *Psychological Science*, *17*, 501-505.
- Knapp, B., Nosofsky, R., & Busey, T. (2006). Recognizing distinctive faces: A hybrid-similarity exemplar-model account. *Memory & Cognition*.

- Humes, L. E., Burk, M. H., Coughlin, M. P., Busey, T. A., & Strauser, L. E. (2007). Auditory Speech Recognition and Visual Text Recognition in Younger and Older Adults: Similarities and Differences Between Modalities and the Effects of Presentation Rate. *J Speech Lang Hear Res*, *50*(2), 283-303.
- Busey, T.A. & Loftus, G. R. (2007). Cognitive science and the law. *Trends in Cognitive Sciences*, *11*, 3, 111-117.
- Schneider, B. L., DeLong, J. E., & Busey, T. A. (2007). Added noise affects the neural correlates of upright and inverted faces differently. *Journal of Vision*, *7*(4):4, 1-24, <http://journalofvision.org/7/4/4/>, doi:10.1167/7.4.4.
- Jeffery, L., Rhodes, G., & Busey, T. (2007). Broadly tuned, view-specific coding of face shape: opposing figural aftereffects can be induced in different views. *Vision Research*, *47*(24): 3070-3077.
- Busey, T., & Palmer, J. (2008). Set-size effects for identification versus localization depend on the visual search task. *J Exp Psychol Hum Percept Perform*, *34*(4), 790-810.
- Miller, B., Troyer, M., & Busey, T. A. (2008). Virtual EEG: A Software-Based Electroencephalogram Designed for Undergraduate Neuroscience-Related Courses. *The Journal of Undergraduate Neuroscience Education (JUNE)*, *7*(1), 19-25.
- Busey, T. A., & Arici, A. (2009). On the role of individual items in recognition memory and metacognition: challenges for signal detection theory. *J Exp Psychol Learn Mem Cogn*, *35*(5), 1123-1136.
- Humes, L. E., Busey, T. A., Craig, J. C., & Kewley-Port, D. (2009). The effects of age on sensory thresholds and temporal gap detection in hearing, vision, and touch. *Atten Percept Psychophys*, *71*(4), 860-871.
- Busey, T., Craig, J., Clark, C., & Humes, L. (2010). Age-related changes in visual temporal order judgment performance: Relation to sensory and cognitive capacities. *Vision Research*, *50*(17), 1628-1640.
- Busey, T. A., & Parada, F. J. (2010). The nature of expertise in fingerprint examiners. *Psychonomic Bulletin & Review*, *17*(2), 155-160.
- Craig, J. C., Rhodes, R. P., Busey, T. A., Kewley-Port, D., & Humes, L. E. (2010). Aging and tactile temporal order. *Attention, Perception, & Psychophysics*, *72*(1), 226-235.
- Spellman, B. A., & Busey, T. A. (2010). Emerging Trends in Psychology and Law Research. *Psychonomic Bulletin & Review*, *17*(2), 141-142.

Burkhardt, A., Blaha, L. M., Jurs, B. S., Rhodes, G., Jeffery, L., Wyatte, D., DeLong, J., & Busey, T. (2010). Adaptation modulates the electrophysiological substrates of perceived facial distortion: Support for opponent coding. *Neuropsychologia*, *48*, 3743–3756.

### Book Chapters

Busey, T. (2001). Formal models of familiarity and memorability in face recognition. To appear in Wenger & Townsend (Eds.) *Computational, Geometric, and Process Perspectives on Facial Cognition*. New Jersey: Erlbaum Associates.

Steyvers, M. & Busey, T. (2001). Predicting similarity ratings to faces using physical descriptions. To appear in Wenger & Townsend (Eds.) *Computational, Geometric, and Process Perspectives on Facial Cognition*. New Jersey: Erlbaum Associates.

O'Donnell, B.F., Wilt M.A.B., Brenner, C.A., Busey, T.A., & Kwon, J.S. (2002). EEG synchronization deficits in schizophrenia spectrum disorders. *International Congress Series* 1232, 697-703.

Busey, T.A. & Dror, I. (in press). Special Abilities and Vulnerabilities in Forensic Expertise. To appear in *The Latent Print Sourcebook*. Alan McRoberts (Ed). Published by the National Institutes of Justice.

### Juried Conference Proceedings

Cottrell, G., Dailey, M. & Busey, T. (1998). Facial memory is kernel density estimation (almost). *Proceedings of Neural Information Processing (NIPS) 1998 Conference*.

Dailey, Matthew N., Cottrell, Garrison W. & Busey, T. A. (1998) Eigenfaces for familiarity. In *Proceedings of the Twentieth Annual Cognitive Science Conference*, Madison, WI, Lawrence Erlbaum, Mah-wah.

Wilt M.A.B., O'Donnell, B.F., Lysaker P.H., & Busey, T.A. (2001). Visual EEG synchronization deficits in schizophrenia. *Psychophysiology*, *32*, Suppl 1, S101.

O'Donnell, B.F., Wilt M.A.B., Brenner, C.A., & Busey, T.A. (2001). EEG synchronization deficits in schizophrenia spectrum disorders. *International Congress Series* 758.

### DISSERTATION

Temporal Inhibition in Two-Pulse Character Detection and Identification Tasks.  
University of Washington, August, 1994.

### FELLOWSHIP REVIEW PANELS

National Department of Defense Graduate Fellowship panel, February, 1999.  
NSF Graduate Fellowship Review Panel, February, 2000.

**PROFESSIONAL ACTIVITIES**

## Papers presented at conferences

- Busey (1994). Linear filter models of character identification. Paper presented at the annual meeting of the Mathematical Psychology Society.
- Busey (1994). Temporal inhibition and character identification. Paper presented at the Annual Interdisciplinary Conference.
- Busey, Tunnicliff, Loftus & Loftus. (1995). Predicting picture-memory performance: Not all confidence judgments are equal. Poster presented at the Annual Psychonomics Society Meeting.
- Busey (1996). The Representation of Stereoscopic Depth Cues in Memory. Paper presented at the annual Object Recognition Conference (OPAM) in Chicago, IL.
- Busey (1996). The temporal frequencies underlying letter identification and localization. Poster presented at the ARVO Annual Conference, Ft. Lauderdale, FL.
- Busey (1997). The temporal frequencies underlying letter identification and localization. Paper presented at the Annual Interdisciplinary Conference.
- Busey & Tunnicliff (1997). False recognition of faces. Poster presented at the Psychonomic Society Annual Meeting in Philadelphia.
- Busey (1997). Accounts of blending and distinctiveness in face recognition. Paper presented at the annual meeting of the Mathematical Psychology Society.
- Busey (1997). How does stereoscopic depth information change the nature of information stored in memory?. Paper presented at the Indiana University Virtual Reality symposium.
- Loftus, G. & Busey, T. (1997) Confidence and accuracy in face recognition. Paper presented at the Society for Experimental Psychologists annual conference.
- Cottrell, G., Dailey, M. & Busey, T. (1998). Eigenfaces for familiarity. Paper presented at Cognitive Science Society Annual Meeting.
- Busey (1998). Summed Similarity Accounts of Face Recognition. Paper presented at the Annual Interdisciplinary Conference.
- Zaki, S. & Busey, T. (1998). Recognizing rotated faces: properties of symmetric Relations. Paper presented at the annual Object Perception and Memory conference (OPAM).
- Arici, A. & Busey, T. (1998). Exemplar-Based Accounts of the Confidence-Accuracy Relation in Face Recognition. Paper presented at the annual meeting of the Mathematical Psychology Society.
- Arici, A. & Busey, T. (1998). Distinctiveness and Typicality in Face Recognition and Metacognition. Poster presented at the annual meeting of the American Psychological Society.
- Loftus, G. & Busey, T. (1998) Accounts of blending, distinctiveness and typicality in the false recognition of faces. Paper presented at the Annual Interdisciplinary Conference.
- Busey, T. (1999). Accounting for recognition of faces at novel viewpoints with exemplar-based models: effects of symmetric orientations. Paper presented at the Annual Interdisciplinary Conference.
- Arici, A. & Busey, T. (1999). Poster presented at the annual meeting of the American Psychological Society.
- Arici, A. & Busey, T. (1999). Metacognition in face recognition. Paper presented at the French Metacognitive Conference.

- Busey, T. & Arici, A. (1999). Familiarity and recollection in face recognition and metacognition. Paper presented at the Psychonomic Society.
- Wild, H. & Busey, T. (2000). Training and the other race effect. Poster presented at the Psychonomic Society.
- Busey, T. & Arici, A. (2001). Recognition and Confidence Judgments of Faces: Contributions of Recollection and Familiarity. Paper presented at the Annual Interdisciplinary Conference.
- Busey, T. & Palmer, J. (2001). Set-Size effects in identification and localization: Theory and data. Paper presented at the Psychonomic Society Annual Meeting.
- Busey, T. & Palmer, J. (2002). Set-Size effects in identification and localization are mediated by task demands. Paper presented at the Annual Interdisciplinary Conference.
- Busey, T. & Palmer, J. (2002). In visual search, the difference between "where" and "what" is mediated by the structure of the decision. Paper presented at the Society for Mathematical Psychology Annual Meeting.
- Wild, H. & Busey, T. (2002). Seeing faces in noise: the role of stochastic activity in perceptual regions. Paper presented at the Psychonomic Society Annual Meeting.
- Wild, H. & Busey, T. (2003). Stochastic activity in face neurons dictates the response to an ambiguous stimulus. Paper presented at the Annual Interdisciplinary Conference.
- Knapp, B., Goldstone, R., & Busey, T. (2003). Integration of perceptual and conceptual information in degraded pictures: evidence from EEG. Paper presented at the Psychonomic Society Annual Meeting.
- Busey, T. A. & Vanderkolk, J. R. (2004). Configural processing in fingerprint experts: Behavioral and electrophysiological evidence. Paper presented at the Psychonomic Society Annual Meeting.
- Busey, T. A. & Vanderkolk, J. R. (2004). Configural processing in fingerprint experts: Behavioral and electrophysiological evidence. Paper presented at the Psychonomic Society Annual Meeting.
- Busey, T. A. & Vanderkolk, J. R. (2004). Behavioral and electrophysiological evidence for configural processing in fingerprint experts. Poster presented at the Summer Annual Interdisciplinary Conference, Cavelese, Italy.
- Busey, T. A. & Vanderkolk, J. R. (2004). Empirical studies of expertise in forensic scientists. Paper presented at the 100th Annual International Association for Identification, St. Louis, MO.
- Busey, T. A. & Vanderkolk, J. R. (2004). Implications of cognitive psychology research for Daubert Hearings. Paper presented at the Daubert Seminar, Las Vegas, NV.
- Busey, T. A. & Vanderkolk, J. R. (2004). Fingerprint expertise. Paper presented at the Indiana Society for Identification annual meeting.
- Busey, T. A. & Vanderkolk, J. R. (2004). Cognitive psychology and fingerprint experts. Paper presented at the Illinois Society for Identification annual meeting.
- Liebe, S., Gold, J. M., Busey, T. A., & O'Donnell, B. (2004). Electrophysiological correlates of the effects of perceptual learning on signal and noise in the human visual system [Abstract]. *Journal of Vision*, 4(8), 297a, <http://journalofvision.org/4/8/297/>
- Busey, T. A. & Vanderkolk, J. R. (2005). Expertise in Fingerprint Examiners. Paper presented at the New England Society for Identification annual meeting.
- Busey, T. A. (2005). The role of configural processing in the development of visual expertise. Paper presented at the Annual Interdisciplinary Conference.
- Busey, T. A., & Vanderkolk, J. R. (2005). Behavioral and electrophysiological evidence for configural processing in fingerprint experts [Abstract]. *Journal of Vision*, 5(8), 635a, <http://journalofvision.org/5/8/635/>

- Vanderkolk, J. R., & Busey, T. A. (2005). Forensic individualization of images. Forensic Identification Seminar of Toronto, Canada.
- Vanderkolk, J. R., & Busey, T. A. (2005). Expert and novice fingerprint studies. Fingerprint Society Lectures, Brighton, United Kingdom.
- Busey, T. A. & Vanderkolk, J. R. (2005). Expertise in Fingerprint Examiners. Paper presented at the International Association of Firearm and Toolmark Examiners annual meeting.
- Schneider, B., DeLong, J., & Busey, T. (2006). On the nature of privileged visual stimuli: Partial immunity from within class inhibition. Poster presented at the Annual Interdisciplinary Conference.
- Schneider, B., DeLong, J., & Busey, T. (2006). On the nature of privileged visual stimuli: Partial immunity from within class inhibition. Poster presented at the Vision Sciences Conference, Sarasota, FL.
- Jeffery, L., Rhodes, G., & Busey, T. (2006). View-specific coding of face shape [Abstract]. *Journal of Vision*, 6(6):669, 669a, <http://journalofvision.org/6/6/669/>, doi:10.1167/6.6.669. Poster presented at the Vision Sciences Conference, Sarasota, FL.
- Busey, T.A. & Schneider, B. (2006). What do EEG/ERP early perceptual components tell us about configural processing? Paper presented at the 2006 meeting of the Configural Processing Consortium, Houston, TX.
- Busey, T.A. (2006). How The Cognitive and Visual Sciences Might Help (and Hurt) in a Daubert Hearing. Paper presented at the 2006 meeting of Forensic Document Examiners Society.
- Busey, T.A. (2006). Measuring Expertise in Latent Print Examiners to Improve the Quantitative Analyses of Latent Prints. Paper presented at the 2006 meeting of the International Association for Identification, Boston, MA.
- Busey, T.A. (2006). Quantifying Human Expertise During Latent Print Examinations. Paper presented at the annual meeting of the National Institutes of Justice, Boston, MA.
- Busey, T. (2007). On the Nature of Privileged Visual Stimuli: An Interaction Between Noise and Inversion. Paper presented at the Annual Interdisciplinary Conference, Jackson, WY.
- Schneider, B., DeLong, J., Wyatte, D., James, K., & Busey, T. (2007). The neural correlates of face-like expertise in fingerprint examiners [Abstract]. *Journal of Vision*, 7(9):575, 575a, <http://journalofvision.org/7/9/575/>, doi:10.1167/7.9.575. Paper presented at the Vision Sciences Conference, Sarasota, FL.
- Blaha, L., & Busey, T. (2007). Electrophysiological substrates of configural learning [Abstract]. *Journal of Vision*, 7(9):796, 796a, <http://journalofvision.org/7/9/796/>, doi:10.1167/7.9.796. Paper presented at the Vision Sciences Conference, Sarasota, FL.
- Busey, T., Schneider, B., Wyatte, D., DeLong, J., Burkhardt, A., & Tjan, B. (2007). Are inverted faces processed at a later stage? [Abstract]. *Journal of Vision*, 7(9):618, 618a, <http://journalofvision.org/7/9/618/>, doi:10.1167/7.9.618. Poster presented at the Vision Sciences Conference, Sarasota, FL.
- Craig, J., Humes, L., Busey, T., & Kewley-Port, D. (2007). Temporal processing in hearing, vision, and touch: Effects of aging. Invited paper presented at the International Research Conference on Aging and Speech Communication, Bloomington, Indiana (2007).
- Busey, T. A. (2007) Expertise in Latent Print Examiners. Invited paper presented at the Indiana Society for Identification annual meeting, Evansville, IN.
- Busey, T., Humes, L., Craig, J., & Kewley-Port, D. (2007). Temporal Processing in Visual, Tactile and Auditory Modalities in the Elderly. Poster presented at the Sixth Annual Summer Interdisciplinary Conference (ASIC 2007), Kalymnos, Greece.

- Busey, T.A. (2007). Measuring Expertise in Latent Print Examiners. Paper presented at the 2007 meeting of the International Association for Identification, San Diego, CA.
- Busey, T.A. (2007). Extracting Expertise from Latent Print Examiners. Paper presented at the annual meeting of the National Institutes of Justice, San Diego, CA.
- Busey, T. A. (2007) Cognitive psychology and fingerprint experts. Paper presented at the Illinois Society for Identification annual meeting, Peoria, IL.
- Humes, L.E., Busey, T., Craig, J. and Kewley-Port, D. (2007) Threshold sensitivity and gap detection across modalities: Effects of aging. American Auditory Society, Scottsdale, Arizona (2007).
- Humes, L., Craig, J., Busey, T., & Kewley-Port, D. (2007) Temporal processing across modalities. Presentation at the American Speech-Language-Hearing Association meeting, Boston, Massachusetts (2007).
- Miller, B.R., Busey, T.A., (2007) A virtual EEG program for undergraduate neuroscience-related courses. Program No. 26.20 2007 Abstract Viewer/Itinerary Planner. San Diego, CA: Society for Neuroscience, 2007. CD-ROM.
- Watson, C., Kidd, G., Busey, T., & Craig, J. (2007). Predicting the ability to learn complex auditory tasks. Poster presented to the Acoustical Society of America, November 2007.
- Busey, T. A., Humes, L., Craig, J., & Kewley-Port, D. (2008). Temporal Processing in Hearing, Vision and Touch: Effects of Aging. Talk presented at the 2008 Annual Interdisciplinary Conference, Jackson, WY.
- Busey, T., Schneider, B. & Wyatte, D. (2008). Expertise and the width of the visual filter in fingerprint examiners. Volume 8, Number 6, Abstract 178, Page 178a  
<http://journalofvision.org/8/6/178/>
- Schneider, B., Harman-James, K., Wyatte, D & Busey, T. (2008). A noise x inversion paradigm reveals the nature of fingerprint expertise for latent print examiners in EEG and fMRI. Volume 8, Number 6, Abstract 177, Page 177a <http://journalofvision.org/8/6/177/>
- Wyatte, D. & Busey, T. (2008). Low and high level changes in eye gaze behavior as a result of expertise. Volume 8, Number 6, Abstract 112, Page 11  
<http://journalofvision.org/8/6/112/>
- Busey, T. & Vanderkolk, J. (2008). Measuring Expertise in Latent Print Examiners. Talk presented at the 2008 International Association for Identification Annual Meeting in Louisville, KY, August 2008.
- Busey, T, Yu, C. & Vanderkolk, J. (2008). The Varieties of Expertise in Latent Print Examiners. Talk presented at the 2008 International Association for Identification Annual Meeting in Louisville, KY, August 2008.
- Busey, T. A., Humes, L., Craig, J., & Kewley-Port, D. (2008). Temporal Processing in Hearing, Vision and Touch. Talk presented at the 2008 Annual Summer Interdisciplinary Conference, Madonna di Campiglio, Italy, July, 2008.
- Busey, T. (2008). Expertise in Latent Print Examiners As Revealed by Behavior, Electrophysiology, and Eyetracking. Invited Syposium presented at the 2008 Psychonomics Society Annual Meeting, Chicago, IL.
- Busey, T, Yu, C., Akavipat, R. & Vanderkolk, J. (2009). Adding Human Expertise to the Quantitative Analysis of Fingerprints. Talk presented at the 2009 National Institutes of Justice Grantees meeting in Tampa, FL, August 2009.
- Vanderolk, J. & Busey, T. (2009). Talk presented at New England Division of the International Association for Identification, Freeport, Maine, November 10, 2009.
- Busey, T., Craig, J., Humes, L. ,& Kewley-Port, D. (2009). Temporal-Order Identification in Visual, Auditory, and Tactile Modalities across the Adult Lifespan. Talk given at the Aging and Speech Communication Conference, Indiana University, Bloomington.

- Burkhardt, A., Schneider, B., Rhodes, G., Jeffrey, L., Wyatte, D., DeLong, D., Blaha, L., & Busey, T. (2009). The Electrophysiological Substrates of Face-Selective Adaptation. Poster presented at EPIC XV, Bloomington, IN.
- Blaha, L., & Busey, T. (2009). Characterizing EEG Correlates of Configural Learning with Linear Discriminant Analysis. Poster presented at EPIC XV, Bloomington, IN.
- Schneider, B. & Busey, T. (2009). The effects of expertise on the visual filter in fingerprint examiners. Poster presented at EPIC XV, Bloomington, IN.
- Busey, T. A., Humes, L., Craig, J., & Kewley-Port, D. (2009). Temporal Processing Across the Senses: Individual Differences in Elders. Talk presented at the 50<sup>th</sup> Annual Meeting of the Psychonomic Society, Boston, MA.
- Busey, T. A., Craig, J., Humes, L., & Kewley-Port, D. (2010). On the nature of age-related changes in temporal order judgment performance. Talk presented at the 2010 Annual Interdisciplinary Conference, Jackson, WY.

#### Invited addresses

Purdue University, 1997

Vanderbilt University, 1998

Notre Dame, 1999

Illinois University, 2003

DePauw University, 2009

3-6 Latent Print Examiner conferences a year to talk about transformative activities

#### Professional Memberships

The Psychonomic Society

#### Ad Hoc Reviewer:

Psychological Review, Journal of Experimental Psychology: Human Perception and Performance, Perception and Psychophysics, Cognitive Psychology, Memory & Cognition, Psychological Science, Journal of Experimental Psychology: Learning Memory & Cognition, National Science Foundation Grant Review

## RESEARCH INTERESTS

My research areas and grants fall into three main categories: perceptual learning and visual expertise with latent print examiners; changes in visual processing with normal aging; and face recognition and memory studied with behavioral and electrophysiological methods. While these three areas may seem disparate, they are all related in to visual expertise, and we use a common set of mathematical tools to bridge the areas. These include linear systems modeling, state-trace analyses, independent component and factor analyses, as well as machine learning algorithms such as support vector machines.

### **Expertise in Latent Print Examiners**

When fingerprint experts attempt to determine whether a latent print matches an inked print, they rely on years of apprenticeship and training in order to identify the features that allow them to judge that the two prints come from the same source with high probability. With support from the National Institutes of Justice, we are currently studying these experts to determine the visual features they are relying on when making these judgments. We are using eyetracking techniques to address how they acquire information from the images, and then we use machine learning algorithms like support vector machines and independent component analyses to recover the feature alphabet that experts choose to use to support this task.

### **Changes in Visual Temporal Processing with Normal Aging**

Normal aging produces deficits in visual, auditory and tactile temporal processing. I am a co-PI on a grant from NIA with Larry Humes (PI) and Jim Craig (coPI). We are measuring temporal processing in tasks such as backward masking, temporal order and gap detection tasks in all three modalities. The goal is to determine whether deficits in one modality are related to changes in other modalities as we age.

### **Brainwave Data for Perception and Memory Tasks**

Perceptual stimuli produce a response in the brain that can be measured by placing electrodes on the surface of the scalp. I maintain an active EEG recording lab with a new 32 channel system. Our experiments have addressed the role of internal noise in face perception, as well as the role of configural processing in fingerprint experts. We are also using this equipment to gather data for an online Virtual EEG project with funding from NSF. A grant from DARPA/ONR supports the application of these tools to the study of visual expertise. I am also a co-PI on a grant with Brian O'Donnell (PI) to address temporal processing in persons with schizophrenia using electrophysiological recordings.

### **Mathematical Modeling of Visual Information Processing**

The processing of a perceptual stimulus is not instantaneous. The sensory response tends to be extended in time, and the nature of this temporal delay affects how the stimulus is processed. This research line uses quantitative models to address the interactions between lower-level sensory processes and higher-level perceptual and information processing mechanisms. We measure the temporal properties of the sensory response, which are signatures of the underlying neural pathways that subserve the processing of a particular task. In this research line I have addressed the processes that underlie character recognition, binocular summation, localization and identification, and temporal inhibition. Articles based on this research appear in *The Psychological Review*, *Journal of Experimental Psychology: Human Perception and Performance*, *Perception & Psychophysics*, *Vision Research* and *The Journal of Mathematica Psychology*.

### **Visual Mechanisms Associated with Face Perception**

Information that is acquired by the early sensory and perceptual mechanisms studied in the previous research area must be stored and later matched with other stimuli to enable recognition. Vision researchers attempting to understand how the visual system encodes visual information have typically used relatively simple stimuli such as sine-wave gratings or gaussian patches. These findings may not reveal how those initial representations are combined by higher-order visual processing mechanism that are responsible for more complex stimuli such as faces. My research investigates the visual mechanisms that are involved in complex pattern perception. We have been most interested in how faces are represented in memory, and what features are included in this representation. In conjunction with my graduate student Anne Arici, we have developed quantitative models that account for different aspects of face recognition data. Articles describing this research are published in *Psychological Science* and *Journal of Experimental Psychology: Learning Memory & Cognition*.

### **Confidence and Accuracy in Eyewitness Testimony**

Jurors often believe, and are often explicitly told by judges, that confident eyewitnesses are more accurate than unconfident eyewitnesses. However, a very small to nil correlation between an eyewitness' confidence and accuracy is often reported in the literature. Motivated by this applied area, I am conducting a series of experiments looking at the basic calibration issues underlying memory performance and a subject's ability to monitor and report their confidence in the accuracy of their memory reports.