Bruce C. Hansen

Contact Information

Department of Psychological and Brain Sciences
Neuroscience Program
Colgate University
120 Olin Hall
Hamilton, NY 13346 USA

Office Telephone: 315-228-7349
Email: bchansen@colgate.edu

Education

University of Louisville Department of Psychological and Brain Sciences *Major Area:* Experimental Psychology *Program:* Perception and Neural Sciences *Specialization:* Vision Science	**Ph.D.**	**2004**
University of Louisville Department of Psychological and Brain Sciences *Major Area:* Experimental Psychology *Program:* Vision Science	**M.A.**	**2003**
University of Michigan-Flint Department of Psychology *Major Area:* Psychology	**B.S. (with honors)**	**2000**

Research/Teaching Experience

2019 – Present	Professor of Psychology & Neuroscience Department of Psychological & Brain Sciences, Neuroscience Program, Colgate University
2013 – 2019	Associate Professor of Psychology & Neuroscience Department of Psychological & Brain Sciences, Neuroscience Program, Colgate University
2007 – 2012	Assistant Professor of Psychology Department of Psychology, Neuroscience Program, Colgate University
2005 – 2007	Post-doctoral Research Fellow McGill Vision Research Unit, Department of Ophthalmology, McGill University, Montréal, Québec, Canada
June 2004	Graduate Research Assistant School of Life Sciences, Fudan University, Shanghai, China
2000 – 2004	Graduate Research/Teaching Assistant Department of Psychological and Brain Sciences, University of Louisville, Louisville, KY, USA

Peer-Reviewed Articles & Proceedings (**denotes Colgate student)

1) Greene, M.R. & **Hansen, B.C.** (2025). Function over form: The temporal evolution of affordance-based scene categorization. *Journal of Vision, 25,* 1-15.

2) Greene, M.R. & **Hansen, B.C.** (2025). Learning task-relevant visual features from large language model (LLM) embeddings. *Cognitive Computational Neuroscience Conference Paper 2025.*

3) **Hansen, B.C.**, Greene, M.R., *Lewinsohn, H.A.S.*, *Kris, A.E.*, *Smyth, S.*, & Tang, B. (2025). Brain-guided convolutional neural networks reveal task-specific representations in scene processing. *Scientific Reports*, 15, 13025.

4) **Hansen, B.C.**, *Gephart, I.S.H.*, *Gobo, V.E.*, Greene, M.R., & Field, D.J. (2022). Uncovering the spatiotemporal dynamics of goal-driven efficient coding with a brain-supervised sparse coding network. *Cognitive Computational Neuroscience Conference Paper 2022*.

5) **Hansen, B.C.**, Greene, M.R., & Field, D.J. (2021). Dynamic electrode-to-image (DETI) mapping reveals the human brain's spatiotemporal code of visual information. *PLOS Computational Biology*, 17, e1009456.

6) Greene, M.R. & **Hansen, B.C.** (2020). Disentangling the independent contributions of visual and conceptual features to the spatiotemporal dynamics of scene categorization. *Journal of Neuroscience*, 40, 5283-5299.

7) **Hansen, B.C.**, Field, D.J., Greene, M.R., *Olson, C.*, & Miskovic, V. (2019). Towards a state-space geometry of neural responses to natural scenes: A steady-state approach. *NeuroImage, 201,* 1-18.

8) Richard, B., **Hansen, B.C.**, Johnson, A.P., & Shafto, P. (2019). Spatial summation of broadband contrast. *Journal of Vision*, 19, 1-19.

9) Greene, M.R. & **Hansen, B.C.** (2018). Shared spatiotemporal category representations in biological and artificial deep neural networks, *PLOS Computational Biology, 14(7)*, e1006327.

10) Greene, M.R. & **Hansen, B.C.** (2018). From pixels to scene categories: Unique and early contributions of functional and visual features. *Cognitive Computational Neuroscience Conference Paper (winner, best paper award) 2018*.

11) Farivar, R., Clavagnier, S., **Hansen, B.C.**, Thompson, B., & Hess, R.F. (2017). Non-uniform phase sensitivity in spatial frequency maps of the human visual cortex, *Journal of Physiology, 595,* 1351-1363.

12) **Hansen, B.C.**, Haun, A.M., Johnson, A.P., & Ellemberg, D. (2016). On the differentiation of foveal and peripheral early visual evoked potentials. *Brain Topography, 29,* 506-514.

13) Ramkumar, P., **Hansen, B.C.**, Pannasch, S., & Loschky, L.C. (2016). Visual information representation and rapid scene categorization are simultaneous across cortex: An MEG study. *NeuroImage, 134,* 295-304.

14) Freeman, T.E., Loschky, L.C., & **Hansen, B.C.** (2015). Scene masking is affected by trial blank-screen luminance, *Signal Processing: Image Communication, 39B,* 319-327.

15) **Hansen, B.C.**, Richard, B., *Andres, K.A.*, Johnson, A.P., Thompson, B., & Essock, E.A., (2015). A cortical locus for anisotropic overlay suppression of stimuli presented at fixation. *Visual Neuroscience, 32 E023, 1-17.*

16) **Hansen, B.C.**, *Rakhshan, P.J.*, Ho, A.K., & Pannasch, S. (2015). Looking at others through implicitly or explicitly prejudiced eyes. *Visual Cognition, 23*, 612-642.

17) Richard, B., Johnson, A.P., Thompson, B., & **Hansen, B.C.** (2015). The effects of tDCS across the spatial frequencies and orientations that comprise the contrast sensitivity function. *Frontiers in Psychology: Perception Science, 6,* doi: 10.3389/fpsyg.2015.01784.

18) Loschky, L.C., Ringer, R.V., Ellis, K, & **Hansen, B.C.** (2015). Comparing rapid scene categorization of aerial and terrestrial views: A new perspective on scene gist. *Journal of Vision, 15,* 1-29.

19) **Hansen, B.C.**, May, K.A., & Hess, R.F. (2014). One "shape" fits all: The orientation bandwidth of contour integration. *Journal of Vision, 14(13),* 1-21.

20) Kirkpatrick, K., Bilton, T., **Hansen, B.C.**, & Loschky, L.C. (2014). Scene gist categorization by pigeons. *Journal of Experimental Psychology: Animal Behavior Processes*, **40**, 162-177.

21) Pannasch, S., Helmert, J.R., **Hansen, B.C.**, Larson, A.M., & Loschky, L.C. Commonalities and differences in eye-movement behavior when exploring aerial and terrestrial scenes. In M. Buchroithner et al. (Eds.) *Cartography from Pole to Pole, Lecture Notes in Geoinformation and Cartography*, Springer-Verlag, Berlin (2014).

22) **Hansen, B.C.** & Loschky, L.C. (2013). The contribution of amplitude and phase spectra defined scene statistics to the masking of rapid scene categorization. *Journal of Vision,13,* 1-21.

23) Ellemberg, D., **Hansen, B.C.**, & Johnson, A.P. (2012). The developing visual system is not optimally sensitive to the spatial statistics of natural images. *Vision Research*, **67**, 1-7.

24) **Hansen, B.C.** & Hess, R.F. (2012). On the effectiveness of noise masks: naturalistic vs. un-naturalistic image statistics. *Vision Research*, **60**, 101-113.

25) **Hansen, B.C.**, Johnson, A.P., & Ellemberg, D. (2012). Different spatial frequency bands selectively signal for natural image statistics in the early visual system. *Journal of Neurophysiology*, **108**, 2160-2172.

26) Kelly, S.D., **Hansen, B.C.**, *Clark, D.T.* (2012). "Slight" of hand: The processing of visually degraded gestures and speech. *PLOS ONE*, **7**, 1-10.

27) Ramkumar, P., Pannasch, S., **Hansen, B.C.**, Larson, A.M., & Loschky, L.C. (2012). How does the brain represent visual scenes? A neuromagnetic scene categorization study. *Machine Learning and Interpretation in Neuroimaging: Neural Information Processing Systems*, 93-100*.*

28) Spiegel, D.P., **Hansen, B.C.**, Byblow, W.D., Thompson, B. (2012). Anodal transcranial direct current stimulation reduces psychophysically measured surround suppression in the human visual cortex. *PLOS ONE*, **7**, 1-9.

29) **Hansen, B.C.**, *Jacques, T.*, Johnson, A.P., & Ellemberg, D. (2011). From spatial frequency contrast to edge preponderance: The differential modulation of early VEPs by natural scene stimuli. *Visual Neuroscience,* **28**, 221-237.

30) Johnson, A.P., Richard, B., **Hansen, B.C.**, & Ellemberg, D. (2011). The magnitude of centre-surround facilitation in the discrimination of amplitude spectrum is dependent on the amplitude of the surround. *Journal of Vision*, **11**, 1-10.

31) **Hansen, B.C.**, Thompson, B., Hess, R.F., & Ellemberg, D. (2010). Extracting the internal representation of faces from human brain activity: An analogue to reverse correlation. *NeuroImage*, **51**, 373-390.

32) Hess, R.F., Li, X., Lu, G., Thompson, B., & **Hansen, B.C.** (2010). The contrast dependence of the cortical fMRI deficit in amblyopia; a selective loss at higher contrasts. *Human Brain Mapping*, **31**, 1233-1248.

33) Loschky, L.C., **Hansen, B.C.**, Sethi, A., & Pydimarri, T.N. (2010). The role of higher-order image statistics in masking scene gist recognition. *Attention, Perception, & Psychophysics*, **72**, 427-444.

34) Hess, R.F., Li, X., Mansouri, B., Thompson, B., & **Hansen, B.C.** (2009). Selectivity as well as sensitivity loss characterizes the cortical spatial frequency deficit in amblyopia. *Human Brain Mapping*, **30**, 4054-4069.

35) Mansouri, B., **Hansen, B.C.**, & Hess, R.F. (2009). Disrupted retinotopic maps in amblyopia. *Investigative Ophthalmology and Visual Science*, **50**, 3218-3225.

36) **Hansen, B.C.**, Haun, A.M., & Essock, E.A. The "Horizontal Effect": A perceptual anisotropy in visual processing of naturalistic broadband stimuli. In T.A. Portocello & R.B. Velloti (Eds.) *Visual Cortex: New Research*, Nova Science Publishers, New York (2008).

37) **Hansen, B.C.**, Farivar, R., Thompson, B., & Hess, R.F. (2008). A critical band of phase alignment for discrimination but not recognition of human faces. *Vision Research*, **48**, 2523-2536.

38) Thompson, B., Farivar, R., **Hansen, B.C.**, & Hess, R.F. (2008). A dichoptic projection system for visual psychophysics in fMRI scanners. *Journal of Neuroscience Methods*, **168**, 71-75.

39) Thompson, B., Troje, N.F., **Hansen, B.C.**, & Hess, R.F. (2008). Amblyopic perception of biological motion. *Journal of Vision*, **8**, 1-14.

40) **Hansen, B.C.** & Hess, R.F. (2007). Structural sparseness and spatial phase alignment in natural scenes. *Journal of the Optical Society of America A*, **24**, 1873-1885.

41) Essock, E.A., **Hansen, B.C.**, & Haun, A.M. (2007). Perceptual bands in orientation and spatial frequency: A cortical analogue to mach bands. *Perception*, **36**, 639-649.

42) Thompson, B., **Hansen, B.C.**, Hess, R.F., & Troje, N.F. (2007). Peripheral vision; good for biological motion, bad for signal noise segregation? *Journal of Vision*, **7**, 1-7.

43) Zheng, Y., Essock, E.A., **Hansen, B.C.**, & Haun, A.M. (2007). A new metric based on extended spatial frequency and its application to DWT based fusion algorithms. *Information Fusion*, **8**, 177-192.

44) **Hansen, B.C.** & Essock, E.A. (2006). Anisotropic local contrast normalization: The role of stimulus orientation and spatial frequency bandwidths in the oblique and horizontal effect perceptual anisotropies. *Vision Research*, **46**, 4398-4415.

45) **Hansen, B.C.** & Hess, R.F. (2006). Discrimination of amplitude spectrum slope in the fovea and parafovea and the local amplitude distributions of natural scene imagery. *Journal of Vision*, **6**, 696-711.

46) **Hansen, B.C.** & Hess, R.F. (2006). The role of spatial phase in texture segmentation and contour integration. *Journal of Vision*, **6**, 594-615.

47) Gunvant, P.G., Baskaran, M., Vijaya, L., **Hansen, B.C.**, Joseph, I.S., Watkins, R.J., Broadway, D.C., & O'Leary, D.J. (2005). Comparison of pulsatile ocular blood flow in indians and europeans. *Eye*, **19**, 1163-1168.

48) **Hansen, B.C.** & Essock, E.A. (2005). Influence of scale and orientation on the visual perception of natural scenes. *Visual Cognition*, **12**, 1199-1234.

49) **Hansen, B.C.** & Essock, E.A. The relationship between human perceptual performance and the physical attributes of night vision imagery. In D.T. Rosen, R.S. Kozak, G.K. Carlson, M.R. Tyler, and S.V. Joist (Eds.) *Trends in Experimental Psychology Research*, Nova Science Publishers, New York (2005).

50) Zheng, Y., Essock, E.A., & **Hansen, B.C.** (2005). An advanced DWT fusion algorithm and its optimization by using the metric of image quality index, *Optical Engineering*, **44**, 037003 (1-12).

51) Zheng, Y., **Hansen, B.C.**, Haun, A.M., & Essock, E.A. (2005). Coloring night-vision imagery with statistical properties of natural colors by using image segmentation and histogram matching. *Proceedings of the SPIE*, **5667**, 107-117.

52) Essock, E.A., Sinai, M.J., DeFord, J.K., **Hansen, B.C.**, & Srinivasan, N. (2004). Human perceptual performance with non-literal imagery: Region recognition and texture-based segmentation. *Journal of Experimental Psychology: Applied*, **10**, 97-110.

53) **Hansen, B.C.** & Essock, E.A. (2004). A horizontal bias in human visual processing of orientation and its correspondence to the structural components of natural scenes. *Journal of Vision*, **4**, 1044-1060.

54) Zheng, Y., Essock, E.A., & **Hansen, B.C.** (2004). An advanced image fusion algorithm based on wavelet transform – Incorporation with PCA and morphological processing. *Proceedings of the SPIE*, **5298**, 177-187.

55) Essock, E.A., DeFord, J.K., **Hansen, B.C.**, & Sinai, M.J. (2003). Oblique stimuli are seen best (not worst!) in naturalistic broad-band stimuli: A horizontal effect. *Vision Research*, **43**, 1329-1335.

56) **Hansen, B.C.**, Essock, E.A., Zheng, Y., & DeFord, J.K. (2003). Perceptual anisotropies in visual processing and their relation to natural image statistics. *Network: Computation in Neural Systems*, **14**, 501-526.

Published Abstracts & Presentations (denotes Colgate student)**

1) **Hansen, B.C.**, *Lewinsohn, H.A.S.*, & Greene, M.R. (2024). How do visual tasks alter the representational space of identical scenes? Insights from a brain-supervised convolutional neural network. [Abstract] in *Journal of Vision, **24**, 1403*.

2) **Hansen, B.C.**, Greene, M.R., & Field, D.J. (2023). The spatiotemporal dynamics of goal driven efficient-coding revealed through brain-supervised sparse coding mapping. [Abstract] in *Journal of Vision*, **23**, 5799.

3) Greene, M.R. & **Hansen, B.C.** (2022). Dynamic neural representations reveal flexible feature use during scene categorization. [Abstract] in *Journal of Vision,* **22**, 4103.

4) **Hansen, B.C.**, Greene, M.R., Field, D.J., *Gephart, I.S.H.*, & *Gobo, V.E.* (2022). How do behavioral goals shape the spatiotemporal evolution of the sparse code for scenes? [Abstract] in *Journal of Vision,* **22**, 4199.

5) Greene, M.R., Leeke, K., **Hansen, B.C.**, & Field, D.J. (2021). Neural Correlates of Efficient Coding of Visual Scenes. [Abstract] in *Journal of Vision*, **21**, 2856.

6) **Hansen, B.C.**, Greene, M.R., & Field, D.J. (2021). Revealing the cortical transformations of real-world scenes using dynamic electrode-to-image (DETI) mapping. [Abstract] in *Journal of Vision*, **21**, 2641.

7) **Hansen, B.C.**, Greene, M.R., & Field, D.J. (2020). A geometric state-space framework reveals the evoked potential topography of the visual field. [Abstract] in *Journal of Vision*, **20**, 1652.

8) Greene, M.R., Field, D.J., & **Hansen, B.C.** (2019). Measuring the information content of visually-evoked neuroelectric activity. [Abstract] in *Journal of Vision,* **19***,* 48c*.*

9) **Hansen, B.C.** & Greene, M.R. (2019). Task demands flexibly change the dynamics of feature use during scene processing. [Abstract] in *Journal of Vision,* **19***,* 189c*.*

10) Haun, A.M. & **Hansen, B.C.** (2019). Visual evoked potentials elicited by complex scenes are regulated by high spatial frequency content. [Abstract] in *Journal of Vision,* **19***,* 123b*.*

11) **Hansen, B.C.**, Field, D.J., & Greene, M.R. (2018). What steady state visual evoked potentials (SSVEP) tell us about the early representation of natural scenes. [Abstract] OSA Fall Vision Meeting 2018.

12) **Hansen, B.C.**, Field, D.J., Greene, M.R., *Olson, C.*, Miskovic, V., & Rhodes, L.J. (2018). Mapping the neuroelectric state-space geometry of natural scenes. [Abstract] in *Journal of Vision,* **18***,* 737*.*

13) Richard, B., Sojitra, R., **Hansen, B.C.**, Shafto, P. (2018). Characterizing non-linear processes in cross-orientation (XOS) with steady-state visual evoked potentials. [Abstract] in *Journal of Vision,* **18***,* 247.

14) Greene, M.R. & **Hansen, B.C.** (2017). Visual, functional, and semantic contributions to scene categorization. [Abstract] in *Journal of Vision,* **17***,* 552.

15) **Hansen, B.C.**, Greene, M.R., *Walsh, C.R.*, *Goldberg, R.L.*, & *Zhang, Y.* (2016). Decoding the informative value of early and late visual evoked potentials in scene categorization. [Abstract] in *Journal of Vision*, **16**, 259.

16) **Hansen, B.C.**, Haun, A.M., Johnson, A.P., & Ellemberg, D. (2015). The functional separability of early visual evoked potentials. [Abstract] in *Journal of Vision*, **15**, 1003.

17) Ramkumar, P., **Hansen, B.C.**, Pannasch, S., & Loschky, L.C. (2015). A rapid whole-brain neural portrait of scene category inference. [Abstract] in *Journal of Vision*, **15**, 351.

18) Richard, B., Birkett, R., **Hansen, B.C.**, & Johnson, A.P. (2015). The effects of trans-cranial Direct Current Injection (tDCS) on discrimination thresholds of the slope of the amplitude spectrum. [Abstract] in *Journal of Vision*, **15**, 768.

19) **Hansen, B.C.**, Kelly, S.D., *Decker, P.*, *Weinstein, R.*, & *Lanphier, S.* (2014). Visual motion energy signal usage in gesture and speech integration: The role of semantic categorization and task demands. [Abstract] in *Journal of Vision*, **14**, 443.

20) Ramkumar, P., **Hansen, B.C.**, *Lee, A.*, *Lanphier, S.*, Pannasch, S., & Loschky, L.C. (2014). A high-resolution neural portrait of natural scene processing. SUNw: Scene Understanding Workshop, Columbus, OH.

21) Richard, B., Andres, K., Thompson, B., Johnson, A.P., & **Hansen, B.C.** (2014). The effects of trans-cranial direct current stimulation (tDCS) on the contrast sensitivity function (CSF). *Canadian Journal of Experimental Psychology*.

22) Richard, B., Johnson, A.P., & **Hansen, B.C.** (2014). An anisotropic gain control model replicates the orientation anisotropy of overlay masking. [Abstract] Society for Neuroscience 2014.

23) Clavagnier, S., Farivar-Mohseni, R., **Hansen, B.C.**, & Hess, R.F. (2013). Does V1 primarily encode spatial frequency or features? [Abstract] in *Journal of Vision,* **13**, 1235.

24) **Hansen, B.C.**, *Andres, K.*, Essock, E.A., Spiegel, D.P., & Thompson, B. (2013). A cortical locus for overlay suppression with broadband stimuli revealed through transcranial direct current stimulation. [Abstract] in *Journal of Vision,* **13**, 38.

25) Johnson, A.P., Richard, B., Ellemberg, D., & **Hansen, B.C.** (2013). Eccentricity-dependent sensitivity loss of amplitude slope discrimination. [Abstract] in *Journal of Vision,* **13**, 1237.

26) Pannasch, S., Helmert, J.R., **Hansen, B.C.**, Larson, A.M., & Loschky, L.C. (2013). Characteristics of ambient and focal processing during the exploration of aerial and terrestrial scenes. [Abstract] in *Journal of Vision,* **13**, 1207.

27) Richard, B., **Hansen, B.C.**, Ellemberg, D., & Johnson, A.P. (2013). Size dependent increase in sensitivity to the slope of the amplitude spectrum is not solely dependent on the increased low spatial frequency representation of larger stimuli. [Abstract] in *Journal of Vision,* **13**, 1238.

28) Ellemberg, D., Richard, B., Johnson, A.P., & **Hansen, B.C.** (2012). Centre-surround interactions on apparent contrast endure with broad-band stimuli [Abstract] *Journal of Vision*, **12**, 96.

29) **Hansen, B.C.**, Richard, B., Johnson, A.P., & Ellemberg, D. (2012). Surround suppression of contrast sensitivity with natural scene stimuli [Abstract] in *Journal of Vision*, **12**, 848.

30) Kirkpatrick, K., Bilton, T., **Hansen, B.C.**, & Loschky, L.C. (2012). Factors influencing scene gist categorization by pigeons. *Invited symposium contribution at the 38th Annual Meeting of the Association for Behavior Analysis International, Seattle, WA.*

31) Pannasch, S., **Hansen, B.C.**, Larson, A.M., & Loschky, L.C. (2012). Further insights into ambient and focal modes: Evidence from the processing of aerial and terrestrial views. [Abstract] 5th International Conference on Cognitive Science.

32) Richard, B., **Hansen, B.C.**, Ellemberg, D., & Johnson, A.P. (2012). Size matters: Increasing stimulus size reduces thresholds in an amplitude spectrum discrimination task. [Abstract] *Journal of Vision*, **12**, 845.

33) Ringer, R.V., **Hansen, B.C.**, *Byrne, K.*, Larson, A.M., & Loschky, L.C. (2012). Amplitude spectrum slope is more important than orientation in rapid scene categorization [Abstract] *Journal of Vision*, **12**, 844.

34) Farivar, R., Clavagnier, S., **Hansen, B.C.**, & Hess, R.F. (2011). What does V1 really care about, frequencies or features? [Abstract] Society for Neuroscience 2011.

35) **Hansen, B.C.**, Johnson, A.P., & Ellemberg, D. (2011). Natural scene image complexity differentially modulates the N1 and P1 components of early VEPs. [Abstract] *Journal of Vision*, **11**, 1121.

36) Spiegel, D.P., **Hansen, B.C.**, Byblow, W.D., & Thompson, B. (2011). Anodal tDCS decreases GABAergic suppression in primary visual cortex. [Abstract] Australasian Winter Conference on Brain Research.

37) **Hansen, B.C.**, *Jacques, T.*, Johnson, A.P., & Ellemberg, D. (2010). Early VEP magnitude is modulated by structural sparseness and the distribution of spatial frequency contrast in natural scenes. [Abstract] *Journal of Vision*, **10**, 923.

38) Kelly, S.D., **Hansen, B.C.**, & *Clark, D.* (2010, July). Two visual pathways for integrating gesture and speech during language comprehension. 4th Conference of the international Society of Gesture Studies, Frankfurt, Germany.

39) Kirkpatrick, K., Ghormley, D., Guevara, M., Garcia, A., Sears, T., **Hansen, B.C.**, & Loschky, L.C. (2010, May). Scene gist categorization in pigeons. [Abstract] Annual Meeting of the Society for Quantitative Analysis of Behavior, San Antonio, TX.

40) Ellemberg, D., Johnson, A.P., & **Hansen, B.C.** (2009). The development of contrast sensitivity for gratings and natural images: Revisiting the golden standard. [Abstract] *Journal of Vision*, **9**, 984a.

41) **Hansen, B.C.**, Thompson, B., Hess, R.F., & Ellemberg, D. (2009). Reverse correlation between the N170 and fractal noise yields human faces: A time-frequency spectrum analysis. [Abstract] *Journal of Vision*, **9**, 465a.

42) Hess, R.F., Thompson, B., Li, X., & **Hansen, B.C.** (2009). The mapping of spatial frequency across amblyopic visual cortex. [Abstract] *Journal of Vision*, **9**, 1056a.

43) Kelly, S.D., **Hansen, B.C.**, & *Sobo, J.* (2009, October). Sleight of hand: The integration of speech and visually degraded hand gestures. [Abstract] 1st annual Neurobiology of Language Conference, Chicago, IL.

44) Loschky, L.C., **Hansen, B.C.**, *Fintzi, A.*, Bjerg, A., Ellis, K., Freeman, T., Hilburn, T., & Larson, A. (2009). Basic level scene categorization is affected by unrecognizable category-specific image features. [Abstract] *Journal of Vision*, **9**, 948a.

45) Ellemberg, D., Johnson, A.P., & **Hansen, B.C.** (2008). The development of natural image contrast sensitivity. [Abstract] *Journal of Vision*, **8**, 346a.

46) Ellemberg, D., Johnson, A.P., & **Hansen, B.C.** (2008). Contrast detection thresholds for natural and 1/f random noise images. *Perception* [Supplement], **37**, 76.

47) **Hansen, B.C.** & Hess, R.F. (2008). Local orientation and texture fixation statistics during free-viewing of natural scene images following brief adaptation. [Abstract] *Journal of Vision*, **8**, 347a.

48) Ellemberg, D., **Hansen**, **B.C.**, & Johnson, A.P. (2007). Discrimination of amplitude spectrum slope of natural scenes during childhood. [Abstract] *Journal of Vision*, **7**, 962a.

49) Farivar, R., **Hansen**, **B.C.**, & Hess, R.F. (2007). Face perception: Importance of phase alignments. [Abstract] *Journal of Vision*, **7**, 623a.

50) **Hansen**, **B.C.** & Hess, R.F. (2007). Orientation tuning of contour integration. [Abstract] *Journal of Vision*, **7**, 605a.

51) Hess, R.F., Thompson, B., **Hansen, B.C.**, & Troje, N.F. (2007). Peripheral vision; good for biological motion, bad for signal/noise segregation. *Perception* [Supplement], **36**, 62.

52) Johnson, A.P., **Hansen**, **B.C.**, & Ellemberg, D. (2007). Center-surround effects in human discrimination of amplitude spectrum slope. [Abstract] *Journal of Vision*, **7**, 967a.

53) Johnson, A.P., **Hansen**, **B.C.**, & Ellemberg, D. (2007, June). Discrimination of amplitude spectrum slope of natural scenes in adults and children. Computational Vision in Neural and Machine Systems (CVR conference), Toronto, Ontario, Canada.

54) Massey, J.M, **Hansen, B.C.**, Wagoner, M, Whitaker, C.M., Roisen, F.J., Magnuson, D.S.K., & Onifer, S.M. (2007). Chronic denervation of glutamatergic primary afferent input leads to loss of the normal dendrite architecture in the adult rat cuneate nucleus. *Society for Neuroscience Abstracts*, **33** Program No. 76.3.

55) Thompson, B., **Hansen**, **B.C.**, Hess, R.F., & Troje, N.F. (2007). Amblyopic perception of biological motion. [Abstract] *Journal of Vision*, **7**, 485a.

56) Thompson, B., **Hansen, B.C.**, Stockdale, C., & Hess, R.F. (2007). Current directions in amblyopia research. *Canadian Journal of Ophthalmology*. [Abstract] *Canadian Ophthalmological Society and Affiliated Societies conference proceedings*.

57) **Hansen, B.C.** & Hess, R.F. (2006, Aug). Local moment, orientation, contour and texture fixation statistics following brief adaptation or during free-viewing of natural scene images. Poster session given at the Sensory Coding and the Natural Environment Biannual Meeting; Gordon Research Conferences, Big Sky, MT.

58) **Hansen, B.C.** & Hess, R.F. (2006). Contour sparseness and the interactions in the visual processing of local phase alignment of natural scene contours. [Abstract] *Journal of Vision*, **6**, 564a.

59) **Hansen, B.C.** & Hess, R.F. (2006, May). Psychophysical evaluation of the importance of spatial phase in texture segmentation and contour integration. Poster given at the 29th Annual McGill Ophthalmology Clinical & Scientific Research Day, Montreal, Quebec, Canada.

60) Haun, A.M., **Hansen, B.C.**, & Essock, E.A. (2006). Aesthetics, mondrians, and the horizontal effect. [Abstract] *Journal of Vision*, **6**, 968a.

61) Hess, R.F. & **Hansen, B.C.** (2006). How important is spatial phase in texture segmentation and contour integration? [Abstract] *Journal of Vision*, **6**, 210a.

62) **Hansen, B.C.** & Hess, R.F. (2005, June). Local amplitude spectrum slope discrimination in the fovea and parafovea and its relationship to natural scene region segmentation. Computational Vision in Neural and Machine Systems (CVR conference), Toronto, Ontario, Canada.

63) **Hansen, B.C.** & Hess, R.F. (2005). Contour processing and the local cross-scale spatial phase alignment of natural scene images, *Perception* [Supplement], **34**, 106.

64) **Hansen, B.C.**, Essock, E.A., and Haun, A.M. (2005). Psychophysical inferences about the interactions within and between sub-populations of striate neurons. [Abstract] *Journal of Vision*, **5**, 479a.

65) Haun, A.M., **Hansen, B.C.**, Kim, Y-J., and Essock, E.A. (2005). Sequential effects and stimulus-response dependencies in an orientation identification task: Characterization of the class 2 oblique effect. [Abstract] *Journal of Vision*, **5**, 158a.

66) Essock, E.A., **Hansen, B.C.**, & Haun, A.M. (2004, May). Assessment of human visual sensitivity to broadband orientations following adaptation to naturalistic orientation biases. Poster session given at the 10th Annual EPSCOR Conference: Pursuing Research Centers of National Stature, Lexington, KY.

67) Essock, E.A., **Hansen, B.C.**, Zheng, Y., Haun, A.M., & Gunvant, P. (2004). "Mach bands" in the orientation dimension: An illusion due to inhibition of nearby orientations. [Abstract]. *Journal of Vision*, **4**, 778.

68) **Hansen, B.C.**, Essock, E.A., & Haun, A.M. (2004). Visual adaptation and its relation to the "horizontal effect": Implications for visual processing of broadband orientation content. [Abstract]. *Journal of Vision*, **4**, 528.

69) **Hansen, B.C.**, Essock, E.A., & Haun, A.M. (2004, May). Perceiving broadband oriented content in veridical and altered coordinate systems. Oral presentation given at the 10th Annual EPSCOR Conference: Pursuing Research Centers of National Stature, Lexington, KY.

70) Essock, E.A. & **Hansen, B.C.** (2003). Seeing the content before the horizon: Visual processing of orientation in natural scenes [Abstract]. *Journal of Vision*, **3**(9), 517a.

71) Essock, E.A., **Hansen, B.C.**, DeFord, J.K., & Sinai, M.J. (2003, May). Human visual processing of orientation in real-world imagery. Poster session given at the 9th Annual EPSCOR Conference: Advances in Research Through EPSCOR, Lexington, KY.

72) **Hansen, B.C.** & Essock, E.A. (2003). Human visual processing of orientation and the slope of the amplitude spectra of natural stimuli [Abstract]. *Journal of Vision* **3**(9), 516a.

73) **Hansen, B.C.**, DeFord, J.K., & Essock, E.A. (2003). When do humans show a horizontal effect instead of an oblique effect?: An analysis of visual anisotropy across breadth of orientation and spatial frequency broadband content. *Association for Research in Vision and Ophthalmology*. Abstract 4091.

74) **Hansen, B.C.**, Essock, E.A., Sinai, M.J., DeFord, J.K., and Zheng, Y. (2003, May). A frequency-based fusion algorithm to improve human performance with non-literal imagery: Optimization of natural scene statistical properties. Oral presentation given at the 9th Annual EPSCOR Conference: Advances in Research Through EPSCOR, Lexington, KY.

75) DeFord, J.K., **Hansen, B.C.**, Sinai, M.J., & Essock, E.A. (2002). Perceptual anisotropy in the salience of broadband image structure. *Association for Research in Vision and Ophthalmology*. Abstract 4721.

76) **Hansen, B.C.**, DeFord, J.K., Sinai, M.J., & Essock, E.A. (2002). Anisotropic processing of natural scenes depends on scene content [Abstract]. *Journal of Vision*, **2**(7), 500a.

77) **Hansen, B.C.**, DeFord, J.K., Sinai, M.J., and Essock, E.A. (2002, July). Manipulation of the amplitude and phase spectra of broadband stimuli: Implications for human visual processing of natural scenes. Poster session given at the Sensory Coding and the Natural Environment: Probabilistic Models of Perception Biannual Meeting; Gordon Research Conferences, South Hadley, MA.

78) Wrobel, T.A., Cheatom, H., Smith, J., Smith, S., & **Hansen, B.C.** (2002, August). Accuracy of memory assessment measures in undergraduate and elderly samples. Poster session given at the American Psychological Association annual convention, Chicago, IL.

79) DeFord, J.K., **Hansen, B.C.**, Sinai, M.J., & Essock, E.A. (2001). The "horizontal effect": An anisotropy in processing natural scenes. *Investigative Ophthalmology and Visual Science*, (Supplement), 42 (4), 3310.

80) **Hansen, B.C.**, DeFord, J.K., Sinai, M.J., & Essock, E.A. (2001, October). A Perceptual anisotropy In processing natural scenes. Poster session given at Research Louisville, Louisville, KY.

81) Wrobel, T.A. & **Hansen, B.C.** (2001, August). Thresholds for gender effects in recognition of distorted pictures. Poster session given at the American Psychological Association annual convention, San Francisco, CA.

82) Allen, G., Combs, K., Galbreath, S., & **Hansen, B.C.** (2000, May). Recognition thresholds for distorted pictures in an elderly sample. Oral presentation given at Meeting of Minds VIII, Dearborn, MI.

83) Cheatom, H., Dickey, T., & **Hansen, B.C.** (2000, May). Recognition threshold for distorted pictures in an undergraduate sample. Poster session given at Meeting of Minds VIII, Dearborn, MI.

84) **Hansen, B.C.** (2000, May). Thresholds in distorted object recognition. Poster session given at the Midwestern Psychological Association, Chicago, IL.

85) **Hansen, B.C.** (2000, May). Thresholds in distorted picture recognition for normal and early alzheimer participants. Poster session given at Meeting of Minds VIII, Dearborn, MI.

86) **Hansen, B.C.** & Ivey, J. (2000, May). The correlation between depression and memory in elderly compared to student sample. Poster session given at Meeting of Minds VIII, Dearborn, MI.

Courses Taught/Thesis Supervision

- Computational Neuroscience
- Human Cognition
- Introduction to Psychological Science
- Introduction to Neuroscience
- Research Seminar in Experimental/Cognitive Psychology
- Senior Research (Psychological Science)
- Senior Thesis (Neuroscience)
- Sensation & Perception
- The Artful Brain: An Exploration in Neuro-aesthetics
- Visual Perception & Cognition

Services & Committees

2024-present	Alternate chair, Institutional Review Board, Colgate University
2008 – 2017; 2024-present	Institutional Review Board Member, Colgate University
2024-2025	Faculty job-search chair, Colgate University
2023-2024	Faculty job-search sub-committee member for two searches, Colgate University
2015 – 2023	Member, Prohibited Conduct Response Group, Colgate University
2019 – 2022	Chair, Department of Psychological & Brain Sciences, Colgate University
2018 – 2022	Olin Hall Users Group; Olin Hall Renovation Planning, Colgate University
2015 – 2020	Co-chair for Faculty, Equity Grievance Panel, Colgate University
2013 – 2019	Director, Neuroscience Program, Colgate University
2009 – 2017	Chair, Institutional Review Board, Colgate University

2010 – 2013	Executive Board of the Upstate Institute, Colgate University
2010 – 2013	Picker Interdisciplinary Science Institute Executive Advisory Committee Member, Colgate University
2013; 2016	Search committee member for a senior curator of collections, Picker Art Gallery, Colgate University
2012	Job Search Chair, Department of Psychology, Colgate University
2008 – 2010	Departmental coordinator of shared research space, Colgate University
2009	Faculty Judge (NASC) for Colgate's Undergraduate Academic Conference
2008	Focus group member, Colgate University

Grants & Awards

2017 – 2020(2023) National Science Foundation: Cognitive Neuroscience Grant ($490,974); PI: Hansen, B.C. (Co-PI: Greene, M.R.)

- *Collaborative Research: RUI: Uncovering the Neural Dynamics of Scene Categorization through Electroencephalography, Machine Learning, and Neuromodulation.*

2015 – 2023(2024) James S. McDonnell Foundation: Understanding Human Cognition ($600,000); PI: Hansen, B.C.

- *Understanding early visual codes and their relative contribution to rapid perceptual inference.*

2013 – 2016 National Science Foundation: Major Research Instrumentation Grant ($199,307); PI: Hansen, B.C. (Co-PIs: Kelly, S.D., Johnson, D.J., & Keating, C.F.)

- *MRI: Acquisition of an Electroencephalography (EEG) System for Integrated Cognitive, Perceptual, and Social Neuroscience Research at Colgate University.*

2007-2009; 2012 Colgate Research Council Discretionary Grant ($5,000)

- *Internal grant that was awarded in support of several projects examining human perception of visual scenes.*

2004 Guy Stevenson Award for Excellence in Graduate Studies, University of Louisville, Graduate School.

- *Highest award given by the Graduate School that honors a former dean of the Graduate School. The Stevenson Award is presented to a doctoral degree recipient who excels in scholarship, leadership, and other areas within their discipline.*

8/03 – 7/04 Grawemeyer Fellow, University of Louisville, Department of Psychological and Brain Sciences ($4,000).

- *A highly competitive supplementary grant awarded by the Department of Psychological and Brain Sciences on the basis of the applicant's plan of research for the academic year in which the grant is awarded.*

6/03 – 6/04 Graduate Research Fellow, NASA Kentucky Space Grant Consortium, Bowling Green, KY ($16,000).

- *A highly competitive external grant awarded based on the applicant's plan of research for the academic year in which the grant is awarded. The research plan involved the perception of broadband oriented content in altered coordinate systems.*

6/02 – 6/03 Grawemeyer Research Award, University of Louisville, Department of Psychological and Brain Sciences ($750).

- *Research travel grant awarded by the Department of Psychological and Brain Sciences on the basis of the applicant's plan of research for the academic year in which the grant is awarded.*

6/02 – 6/03 Graduate Research Fellow, NASA Kentucky Space Grant Consortium, Bowling Green, KY ($16,000).

- *A highly competitive external grant awarded based on the applicant's plan of research for the academic year in which the grant is awarded. The research plan involved human visual performance with multi-sensor imagery.*

8/01 – 6/02 Grawemeyer Fellow, University of Louisville, Department of Psychological and Brain Sciences ($4,000).

- *A highly competitive supplementary grant awarded by the Department of Psychological and Brain Sciences on the basis of the applicant's plan of research for the academic year in which the grant is awarded.*

2000 Alfred C. Raphelson Prize, Recognition of Outstanding Research Award, University of Michigan-Flint, Department of Psychology.

- *A highly prestigious award given by the Department of Psychology in recognition of the nominee's research activities. The specific research project involved the recognition of distorted pictures in individuals afflicted with early dementia of the Alzheimer's type.*

Peer Reviews

Journal Articles Reviewed:

Applied Optics; Attention, Perception, & Psychophysics; Behavior Research Methods; BMC Neuroscience; Canadian Journal of Experimental Psychology; Cerebral Cortex; Cognition; European Journal of Neuroscience; Experimental Brain Research; Experimental Gerontology; Frontiers in Cognitive Science; Frontiers in Neuroscience; Frontiers in Perception Science; Frontiers in Psychology; i-Perception; Journal of Experimental Psychology: Applied; Journal of Cognitive Neuroscience; Journal of Neurophysiology; Journal of the Optical Society of America; Journal of Vision; Nature Communications; Neuropsychologia; PLOS Computational Biology; PLOS ONE; Proceedings of the Royal Society B, Psychology of Aesthetics, Creativity, and the Arts; Psychophysiology; Scientific Reports; Seeing & Perceiving; Vision; Vision Research

Grant Review Panel Member: National Science Foundation

Textbook Chapters Reviewed:

Mind to Brain & Back Again: where Psychology & Neuroscience meet 1/e: W.W. Norton & Co.
Psychology 8/e: W.W. Norton & Co.
Cognitive Neuroscience & Neuropsychology 2/e: Cengage Wadsworth Publishing

Technical Skills

Programming Languages:	C, C++, MATLAB, openGL Specific MATLAB toolboxes utilized include: all versions of the Image Processing, Parallel Computing, Signal Processing, Statistics and Machine Learning, and Wavelet toolboxes.
Neuroimaging & Neuro-stimulation:	*Electroencephalography:* Electrical Geodesics Incorporated (Magstim-EGI) & BrainVision Analyzer. *Magnetoencephalography:* Elekta Neuromag Vectorview data source localization in BrainStorm. *Transcranial direct current stimulation:* Electrical Geodesics Incorporated (Magstim-EGI) GTEN HD tDCS system; Chattanooga Ionto Device Kit. *Structural MRI:* MINC tools (Montreal Neurological Institute); BrainVISA; Freesurfer. *Structural & functional MRI:* Brian Voyager QX; Statistical Parametric Mapping (SPM); FMRIB Software Library (FSL). *Transcranial Magnetic Stimulation:* MagStim Rapid 2 Integrated Operating System; Brainsight (frameless stereotaxy).
Imaging/sensor Systems:	Talon/IRvista Near-infrared, Infrared, and Image Intensifier sensor systems, Optical Imaging of Intrinsic Signals mapping, STRATUSOCT (direct cross-sectional imaging), IL1700 Research Radiometer, UDT S370 Optometer; EyeLink 1000 remote video eye tracker with Experiment Builder software package; Cambridge Research Systems Video Eye Tracker, Video Eye Tracker fixation mapping.