

Jason A. Droll, Ph.D.
Scientist

Professional Profile

Dr. Jason A. Droll is a Scientist in Exponent's Human Factors practice. Dr. Droll has expertise in human visual perception, visual attention, memory, cognition, and reaction time. He evaluates the reliability of observer perceptions, and analyzes failures to perceive or remember salient visual information, such as those due to distraction. He uses his research experience to assess the performance and behavior of drivers, pedestrians, and occupational workers, among others. Additionally, Dr. Droll focuses on how people interact with various consumer and industrial products and their warning labels and safety information. Dr. Droll has extensive experience in human subjects testing, most notably in several studies examining the role of eye movements on visual perception and attention.

Dr. Droll's graduate work spanned a wide range of research, including investigating the activity of single neurons in visual cortex, and examining hand and eye coordination during tasks performed in virtual reality. After graduation, he was awarded a Postdoctoral Research Fellowship, sponsored by United States Intelligence agencies, to study how people learn the spatial structure of visual scenes and how this knowledge influences eye movements and perceptual decisions. He has also compared performance during visual tasks to computational models in order to test theories of visual attention.

Academic Credentials and Professional Honors

Ph.D., Brain and Cognitive Science, University of Rochester, New York, 2005

M.S., Brain and Cognitive Science, University of Rochester, New York, 2003

B.A., Molecular Biology, University of California, Santa Cruz, 1998

Fellowships and Grant Support

Post Doctoral Fellowship Proposal (HM1 582-05-1-2018) National Geospatial Intelligence Agency "Optimizing Visual Change Detection and Gaze Control by Learning Scene Statistics," Award: \$240,000, 2006–2008

NEI Pre-doctoral Training Grant, Center for Visual Science, University of Rochester, 1999–2003

Peer-Reviewed Journal Articles

Droll JA, Eckstein MP. Gaze control and memory for objects while walking in a real world environment. *Visual Cognition*, Special Issue, in press.

Eckstein MP, Peterson M, Pham B, Droll JA. Statistical decision theory to relate neurons to behavior in the study of covert visual attention. *Vision Res* 2009. Epub ahead of print: PMID: 19138699.

Droll JA, Abbey CK, Eckstein MP. Learning cue validity through performance feedback. *J Vision* 2009; 9(2):18, 1–22. <http://journalofvision.org/9/2/18/>, doi:10.1167/9.2.18, 2009.

Droll JA, Hayhoe MM. Trade-offs between gaze and working memory use. *J Exp Psych: Hum Percept Perform* 2007; 33(6):1352–1365.

Droll JA, Gigone K, Hayhoe MM. Learning where to direct gaze during change detection. *J Vision* 2007; 7(14):6, 1–12.

Droll JA, Hayhoe MM, Triesch J, Sullivan BT. Task demands control acquisition and storage of visual information. *J Exp Psych: Hum Percept Perform* 2005; 31(6):1416–1438.

Bisley JW, Zaksas D, Droll J, Pasternak T. Activity of MT neurons during a memory for motion task. *J Neurophysiology* 2003; 90:2752–2757.

Book Chapters

Droll JA, Hayhoe MM. Seeing what we can do: Insights into vision and action through observations of natural behavior. In: *Handbook of Embodied Cognition*. Garzon P, Gomila T (eds), Cognitive Science, Reed Elsevier, in press.

Hayhoe MM, Droll JA, Mennie N. Learning where to look. In: *Eye movement research: Insights into mind and brain*. Van Gompel R, Fischer M, Murray W, Hill R (eds), Reed Elsevier, 2007.

Conference Presentations

Droll JA, Pham BT, Abbey CK, Eckstein MP. Gaze control and perceptual decisions are modulated by learned expected reward. *Vision Sciences Society Meeting Abstracts*, Vol. 7, 2007.

Droll JA, Pham BT, Abbey CK, Eckstein MP. Implicit, but not explicit, measures of learning cue validity during visual search require task feedback. *Society for Neuroscience Abstracts*, Vol. 32, 2006.

Droll J, Gigone K, Hayhoe M. Influencing gaze allocation through Bayesian integration of environmental probabilities. *Society for Neuroscience Abstracts*, Vol. 30, 2005.

Droll J, Hayhoe M, Triesch J, Sullivan B. Working memory for object features is influenced by scene context. *Vision Sciences Society Meeting Abstracts*, Vol. 4, 2004.

Droll J, Hayhoe M, Triesch J, Sullivan B. Attention is not enough: Task micro-structure determines visual information acquisition. *Society for Neuroscience Abstracts*, Vol. 29, 2003.

Droll J, Hayhoe M, Triesch J, Sullivan B. Influence of task demands on object representations. *European Conference on Visual Perception Abstracts*, Vol. 26, 2003.

Droll J, Hayhoe M, Triesch J, Sullivan B. Task relevance of object features modulates the content of visual memory. *Vision Sciences Society Meeting Abstracts*, Vol. 3, 2003.

Conference Posters

Droll J, Eckstein M. Expected object position of two hundred fifty observers predicts first fixations of seventy seven separate observers during search. *Abstract. J Vision* 2008; 8(6):320, 320a. <http://journalofvision.org/8/6/320/>, doi:10.1167/8.6.320.

Droll JA, Eckstein MP. Understanding visual change perception in unconstrained environments using eye tracking. *IC Postdoctoral Research Fellowship Colloquium*, 2007.

Droll JA, Pham BT, Abbey CK, Eckstein MP. Learning predictive cues to optimize visual search. *Vision Sciences Society Meeting*, Vol. 6, 2006.

Gigone KM., Droll JA, Hayhoe MM. Gaze patterns in search reflect learnt environmental probabilities and rewards. *Vision Sciences Society Meeting*, Vol. 6, 2006.

Chajka K, Hayhoe MM, Sullivan BT, Pelz J, Mennie N, Droll JA. Predictive eye movements in squash. *Vision Sciences Society Meeting*, Vol. 6, 2006.

Robinson AE, Triesch J, Hayhoe MM., Droll JA, Sullivan BT. Change blindness during multiple interactions with a single object. *Vision Sciences Society Meeting*, Vol. 6, 2006.

Droll JA, Hayhoe MM. Knowing when to remember and when to forget: Expected task relevance controls working memory use. *Vision Sciences Society Meeting*, Vol. 5, 2005.

Droll JA Hayhoe MM, Sullivan BT. Task demands control acquisition and maintenance of visual information. *Object Perception, Attention & Memory Meeting Abstracts*, Vol. 12, 2004.

Droll JA Hayhoe MM, Sullivan BT. Gaze and hand movements indicate acquisition of new object features. *Society for Neuroscience Abstracts*, Vol. 30, 2004.

Droll JA, Zaksas D, Bisley JW, Pasternak T. MT neurons respond to remote visual motion stimuli used in a working memory task. *Society for Neuroscience Abstracts*, Vol. 27, 2001.

Droll JA, Bisley JW, Pasternak T. Activity in MT neurons during a memory for visual motion task. European Conference on Visual Perception Abstracts, Vol. 24, 2001.

Droll JA, Bisley JW, Pasternak T. The delay activity of some MT neurons may signal the remembered direction of motion. Vision Sciences Society Meeting Abstracts, Vol. 1, 2001.

Droll JA, Bisley JW, Pasternak T. Delay activity in area MT neurons during a visual working memory task. Society for Neuroscience Abstracts, Vol. 26, 2000.

Droll JA, Bisley JW, Pasternak T. Delay activity in area MT neurons during a visual working memory task. IOVS Suppl. (abstracts), 41:4, 2000.

Invited Colloquia

Droll JA. Optimizing visual change detection and gaze control by learning scene statistics. Intelligence Community Postdoctoral Research Colloquia, Chantilly, VA, April 2008.

Droll JA. The role of expectation in decisions of where to look and what to remember. Horizons of Vision Research Conference, Long Beach, CA, March 2008.

Droll JA. Inferring cognitive states through eye movements during natural behavior. NASA Ames, Palo Alto, CA, March 2008.

Peer Reviewer

- Journal of Cognitive Neuroscience
- Reed Elsevier Publications
- Vision Research
- Journal of Experimental Psychology
- Cognition
- Neuropsychologia
- Psychonomic Bulletin & Review
- Journal of Vision
- National Science Foundation Grant Review

Professional Affiliations

- Vision Sciences Society (member)
- Human Factors and Ergonomics Society (member)